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Give the Standardization Committee Active Support

THE matter of the elimination of waste through simplified practice in shipbuilding and ship operating took very definite form at the meeting of the Standardization Committee at the Department of Commerce, Washington, on December 20. Had that committee existed prior to the war there is no doubt but what many millions of dollars would have been saved and many errors of judgment avoided during that trying period; while the chaos following the sudden termination of hostilities would not have been nearly as great as it was—and is. What would have been the outcome in the railway field after the frightful demoralization which resulted from government operation had that industry not started to clean house in the matter of variations in building and operating practices years ago and kept at it ever since? Then there is the more recent parallel in the automotive industry where the results have been marked. Again, right in our own field we have but to point to Great Britain, where the work of standardization began soon after the end of the war and is now proceeding deliberately and with well defined results.

But, "it is never too late to mend." The way is clear and the necessary machinery is almost ready, in the form of one of the ablest committees ever gotten together in the marine or any other field for any purpose. All that is now needed

is support—not passive, but active and hearty; and we have enough faith in the men from whom that support must ultimately come to predict that they will not be found wanting when called upon.

Labor Depends Upon Transportation

THE greatest blessing that any country can enjoy is steady employment at good wages for each and every one of its workers. This condition cannot be obtained in any nation unless its arteries of transportation are capable of handling the products of its farms and its factories expeditiously. Probably Henry Ford is prouder of the fact that he is giving steady employment to 100,000 men than of any other thing that he has accomplished. But Mr. Ford cannot continue to keep these men busy unless he can transport his automobiles not only to every place in this country but also to practically every port in the world.

It was stated and acknowledged on the floor of the Senate during the month just passed that 10,000 carloads of apples of the kind that we are paying ten cents a piece for here in New York city were dumped into the Columbia river from one section of the state of Washington alone. Neither sufficient warehouse space nor railroad cars for their transportation were available, but, if vessels equipped with refrigeration space could have been chartered at Seattle or Portland, the greater portion of this and similar crops could have been salvaged. And every shipload would have meant a payroll for the farmers and, through their increased purchasing power, employment for the workers of that section of the country.

Our statesmen have at last begun to realize that the influence of America is necessary to get Europe out of its economic chaos. Until it is made possible for the countries "over there" to resume normal production, the peace of the world is in danger. Even England has had, and still has, a serious unemployment question on her hands.

We have much to be thankful for at present. The indications, due to the immigration law, are that there will be plenty of work for everybody during the coming year, but this condition will not prevail, if either our rail or water transportation facilities are unable to handle the products of our industries. The ships of European maritime countries may at any time be withdrawn. Why then should we allow ourselves to depend on them?

Does not the Senate realize that the benefits to be derived from a merchant marine are general and not local? Does it not realize that the competition of an adequate American

merchant marine will insure reasonable transportation rates? Does it not realize that capital will not be interested in shipping unless the pending legislation is enacted into law, or must it wait until a catastrophe actually occurs?

Chamber of Commerce of the United States Urges Senate to Grant Government Aid to Shipping

ELLIOT H. GOODWIN, resident vice president of the Chamber of Commerce of the United States, has recently sent a letter to the members of the Senate urging favorable consideration of the ship subsidy bill. A communication of this kind, coming from such an institution whose special committees are constantly reviewing world conditions and their relation to our commercial prestige and national safety, ought to make a profound impression on any fair minded senator.

"In 1915," said Mr. Goodwin, "our membership, by a vote of nearly 3 to 1 favored subsidies from the Government, sufficient to offset the difference in cost between the operation of vessels under the American flag and the operation in the same deep sea trades under foreign flags.

"In March, 1920, in a new referendum the National Chamber's membership by a vote of over 15 to 1, coming from 44 states, the District of Columbia and American Chambers of Commerce, in Hawaii, Porto Rico, Alaska, Mexico, Italy, France and Cuba, favored a general declaration by Congress to give aid toward the maintenance of a privately owned and operated American merchant marine.

"Again in 1922 the subject was brought before our membership. At our annual meeting a resolution was unanimously adopted favoring an adequate privately owned and privately operated merchant marine, with aid from the Government which is essential to the maintenance of such a merchant marine.

"It was recognized then that our position as the second maritime nation of the world *newly gained as a result of shipbuilding operations during the war* could not be maintained without the grant of Government aid to present and prospective owners of our ships."

This newly gained commerce which Mr. Goodwin refers to as being a result of our shipbuilding activities during the war is strikingly illustrated in a recent report of the National City Bank of New York. This report says that the total exports for October, 1922, exceed any month in the past one and a half years. "They total \$372,000,000 and are not only the biggest of any one in the last 18 months but are nearly 20 percent above those of the immediately preceding month, 33 percent greater than in the opening month of the calendar year and 35 percent more than in the corresponding month of the preceding year."

An interesting feature of the increase in our export trade is the fact that the principal gains have been made by the manufacturers and exporters who are endeavoring to hold on to the business that they gained in the World War.

Comparing our export returns for the month of October with those of Great Britain, we find that our chief maritime rival suffered a loss of \$10,000,000 in her exports as com-

pared with the month of September. British domestic exports for October totaled \$294,000,000 as compared with about \$366,000,000 of domestic exports from the United States in the same month.

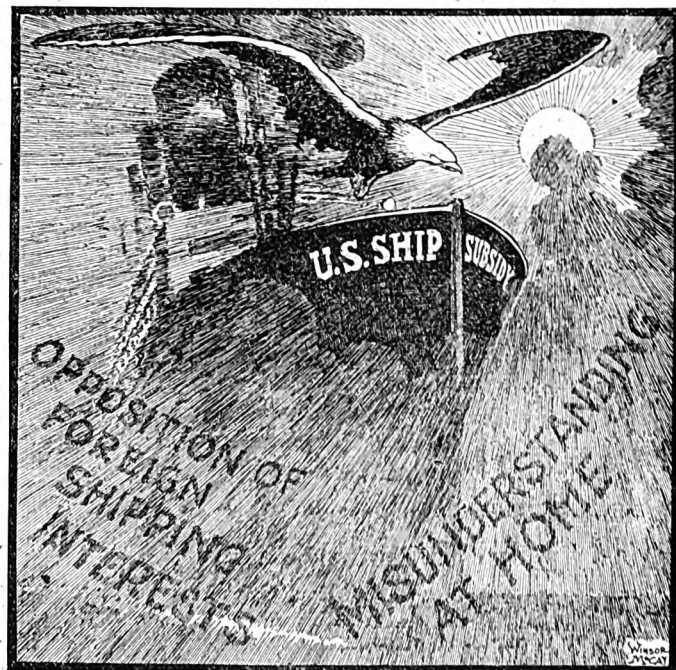
From a report just received from the Department of Commerce a new high record for the year was established for November, which shows that American industries benefited from the export business during that month to the amount of \$383,000,000. Comparing November, 1922, with the same period of 1913, an increase of more than \$138,000,000 over pre-war shipments abroad is shown.

Remembering that the United States is now clearly the leading nation in domestic exports whereas in 1913 Great Britain exceeded our domestic exports by over \$100,000,000, can anyone having ordinary common sense fail to see the important role that has been played by American ships even under Government ownership and the vital factor that they are bound to become to the future prosperity of the whole nation?

"Der Tag"

MR. McCAY'S splendid cartoon which appears on this page indicates the present status and the future of the American merchant marine in a far clearer way than it can be expressed by language. Many of us have waited through long dreary years for "der Tag" when America would resume, as of yore, her rightful place on the seas and in the ports of the world.

Time and time again our hopes have been raised that our people at last realized the vital necessity of an adequate merchant marine only to have them shattered through a lack of understanding and the sinister influence of foreign shipping interests. Some Americans seem to have a mania for



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Coming Out of the Fog

—McCay in the *New York American*

doing and saying things that will please our foreign maritime competitors and even certain daily newspapers in this great seaport of New York whose very existence depends upon American patronage have taken every opportunity to misrepresent every constructive effort that has been made to build up an American merchant marine.

How the American people, having the knowledge that the lack of an adequate merchant marine compelled this country to spend between three and four times its pre-war national debt for the construction of emergency ships, have allowed constructive action to be delayed thus far is beyond our comprehension and the only answer seems to be that it has been due to powerful forces working behind the scenes.

At last, however, and largely through the influence of President Warren G. Harding, the House of Representatives has, for the first time in our history, passed a general subsidy bill. We know how it is with the President and at this writing the Senate alone stands in the way of the fulfillment of the country's destiny. Business men naturally discount any deal that is not signed, sealed and delivered, but in this case we believe that Mr. McCay has accurately portrayed the future, because the opposing senators have only temporary or permanent Government ownership of shipping to offer as an alternative, which means that their position is too weak to prevent a show-down before March 4.

The Motorship Outlook

IT has been the general belief that until the great surplus of cargo steamers owned by the Government could be sold to private owners and absorbed in the trade, shipyards could hardly expect much in the way of new construction except in passenger liners and special types of vessels. Admiral Benson, however, is showing the way not only to dispose of a number of these vessels but also to give the shipyards and repair yards a great deal of work in converting them into motorships at a cost upon which the fixed charges as compared with a steamer will not eat up the great fuel savings of the Diesel engine.

Admiral Benson is holding conferences with representatives of the shipyards and manufacturers of Diesel engines and equipment in order to determine the proper differential that the Shipping Board ought to place upon the steamers that it sells, as is and where is, and the vessels that it disposes of on condition that they are converted into motorships. In addition to this, the conferences are intended to bring out any points or ideas that will indicate how the total cost of the entire motorship machinery installation may be reduced to a minimum.

As the vessels owned by the Government may be classed in a very small number of types, the problem is entirely different from that of constructing new ships of varying characteristics. For instance, the question was brought up, cannot the sizes of the deck and auxiliary machinery for each class of vessels be standardized as to sizes?

It is plain that if such a work could be done by an authoritative committee—and considering the data that the Shipping Board must have on hand relating to the past performance of these vessels, it ought not to be so difficult a

job—immediate dividends would be realized in obviating the necessity for the cost of new plans and specifications by each purchaser.

Again, where fixed units are determined upon, it would enable the electric companies to reduce the cost of producing motors for the same to a minimum. In fact, would the matter not be reduced to a stock proposition?

While it is not our policy to at any time advocate machines of any particular manufacture, nevertheless we do think that by reducing the number of sizes and powers required concentration of effort will the more quickly produce units of maximum efficiency.

At the present time it may seem a bit facetious to suggest anything that savors of quantity production, but the fact should not be overlooked that the Shipping Board is prepared through concessions on its surplus stock of existing vessels to make it possible to obtain motorships in this country cheaper than they can be built anywhere in the world.

Tramp Contracts Signify Revival in English Shipbuilding

IN England those in close touch with the shipbuilding industry have said that the first sign of a genuine revival in the trade would be the ordering of a fair number of tramp steamers. Quite a number of contracts for ordinary cargo steamers of the tramp type have been placed in the United Kingdom during the last six weeks, so if indications that have heralded returning activity in shipbuilding in former times hold good a change for the better is in sight.

One of the most significant reasons why England has made such a great success as a maritime nation is the fact that British shipowners have always pursued the policy of disposing of their out-of-date vessels to foreigners. Although action of this sort has been prevented during the present depression by a lack of market abroad, it is fairly safe to prophesy that the next few years will witness a transformation in the British merchant marine in which post war designs of the most efficient type will prevail.

It should be recognized that the lack of the most up-to-date and efficient types of vessels is a far greater handicap to the success of any merchant marine than any wage or manning differentials now existing. England's maritime success proves this, for her wage costs are much higher, with the exception of the United States, than her competitors.

Just as surely as the iron ship and the screw propeller drove the wooden sailing vessel off the seas so will the most efficient vessels of the future which are capable of giving the greatest returns for the money invested make it impossible for a large percentage of the so-called surplus world tonnage to operate. And, further, when that time comes it will be found that new ships cannot be constructed as cheaply as they can be now. The new English contracts would not have been forthcoming if the bottom in prices had not been reached. America will profit by accelerating rather than retarding the tentative construction, reconditioning and conversion projects now in hand.

Sufficient Votes to Pass Subsidy Bill Are Assured; Night Sessions Will be Resorted to if Necessary

Senator Jones in Brilliant Address Tells in Plain Language Exactly What the Provisions of Bill in Present Form Are

THE Merchant Marine Bill with amendments to the House bill as proposed by the Committee on Commerce was reported to the Senate on December 9. The majority report favorably recommending a decision on the measure was signed by 11 members of the committee, and the minority report presented by Senator Fletcher was signed by 5 members of the committee.

At this writing fully 48 senators are committed to vote for the bill and only one of the doubtful class is necessary to assure its passage. Of course the principal anxiety of the proponents of the measure is the possibility that the opposition may succeed in delaying action until March 4. In order to prevent such a catastrophe to the welfare of our shipping, Senator Jones has determined to have the Senate convene at 11 o'clock instead of 12, wherever possible, to keep it in session until 5:30 or 6 every evening, and to insist on night sessions if it is found to be necessary. Friends of the measure will also be asked to attend all sessions regularly to prevent delays incident to roll calls where the point is made of no quorum.

NORRIS BILL CANNOT SUPPLANT SHIPPING ACT

Senator Norris has had a bill reported to the Senate which provides for a revolving fund of \$100,000,000 for the purpose of buying and selling farm products. It is not believed, however, that this bill, which is not the rural credits legislation sponsored by the Administration, can secure enough backing to block the shipping bill.

The rural credits measure is expected to be whipped into shape for presentation to the Senate during the first part of January, and then the shipping act will probably be temporarily sidetracked for the farmers' bill. The farmers' bill, however, will not take much time, as there is little opposition to giving all reasonable assistance to agriculture. After the Senate has assisted farming, it cannot consistently refuse similar aid to shipping.

SUBSTANTIAL CHANGES MADE

A few substantial changes have been made in the shipping bill as passed by the House by the Committee on Commerce. There are also a number of minor changes.

The taxation exemptions concerning the operation and sale of ships were stricken out. They are already in the Jones Act of 1920.

The amount of compensation that may be paid in any one year is limited to \$30,000,000, which is considered sufficient to provide for an American merchant marine carrying over 50 percent of our commerce.

The provision in the House bill requiring specific appropriations to be made annually from the merchant marine fund has been stricken from the bill. In its place it is proposed to forbid the Shipping Board from increasing compensation provided in any contract without a specific appropriation from Congress. It was believed that the provision of an annual appropriation even from an existing fund would prevent capital from investing in shipping ventures, although there is little doubt that Congress would live up to all legitimate contracts. In connection with this we might say that Congress has the power to repeal the Shipping Act at any time, even at the next session if it so desires,

but that it would not invalidate any contracts made up to the time of the repeal.

It is also provided that no contracts shall extend beyond 15 years from the enactment of the law. If at the end of that time we have not built up a merchant marine, it will be necessary to devise another plan.

SENATOR JONES' SPEECH

Senator Jones made a brilliant speech on December 12 and 13, which was a masterpiece for plain reasoning and plain language. While he attributed to the opponents of the shipping bill all the sincerity of purpose that actuates those who champion it, nevertheless, it is beyond our understanding how anyone having the privilege of hearing Senator Jones' address and at the same time knowing how the lack of a constructive shipping policy has kept American privately-owned ships out of the foreign trade for 60 years, can honestly and conscientiously oppose the present measure.

The following analysis of the shipping bill in its present form was included in Senator Jones' address, and to our mind it is the best explanation of the measure so far given, for it tells in language that everyone can understand just what this highly technical and complex act provides.

TITLE 1—AMENDMENTS TO JONES ACT—SALES

The amendment broadens the power of the board to make sales, but limits the minimum rate of interest to 4¼ percent, the maximum period of time over which payments are to be distributed to 15 years, and provides that the payments must at all times cover the depreciation of the vessel. The *Leviathan* may not be sold for less than the cost of reconditioning.

That is one provision put in in the House. There probably will be considerable discussion about that. It is going to cost about \$9,000,000 to recondition the *Leviathan*. Her sister ships were reconditioned by the British Government and turned over to the British companies for \$4,000,000. How we can hope anybody would take the *Leviathan* and pay the \$9,000,000 for her and then compete with these sister ships I do not know, but the Senate committee did not see fit to strike out that provision.

The sales policy is also amended to emphasize the desirability of maintaining routes from outports and of giving the domestic communities primarily interested the first opportunity for two years to purchase such routes. Domestic communities are defined. The bill affirms the purpose of discouraging monopoly in shipping.

INSURANCE

Purchasers on the deferred-payment plan are required to keep the equity of the United States insured, protected by hull insurance, and, if the board so requires, by protection and indemnity insurance. The board may create an insurance fund in which it may insure any plant or materials owned by the board or the equity of the United States on any vessel or in which a purchaser may insure the equity of the United States if he is unable to insure such equity in the American insurance market at as low a price as it could be placed abroad.

CONSTRUCTION LOAN FUND

The act of 1920 is amended so that the construction loan fund of \$125,000,000 may be created as the money becomes available instead of at the rate of \$25,000,000 per year. The loan may be used for the construction of the most efficient types of vessels or the installing of efficient machinery in existing hulls.

The loan is limited to an amount of two-thirds of the value of the ship constructed or re-equipped, and may not be loaned for longer than 15 years nor at less than 4¼ percent interest.

The Senate committee reported a proviso prohibiting the loan of this money to companies or corporations for the building

of ships for the carrying of their own products. The committee thought it was wise to make that limitation on that fund.

MAIL

The act of 1920 is amended by withdrawing the power which it gave to the Postmaster General in conjunction with the chairman of the Shipping Board to make contracts for the carriage of ocean mails. The ocean mail act of 1891 is repealed.

TITLE 2—EXEMPTION FROM TAXATION

Title 2 of the bill concerns taxation, and there were two provisions in that as it passed the House providing for an exemption from income tax on the operation of the ships and on the sale of ships. Those were provisions which were in the act of 1920, and it was hoped that under the conditions existing at that time many new ships would be built under those provisions, but for some reason the Treasury Department rules and regulations authorized in that act have not yet been made and approved, and so those provisions have not been put into operation. It was stated by the experts that there would be no practical benefits from those provisions at this time under the present laws and in present conditions, and so the committee struck out those two provisions from the bill as it passed the House.

TONNAGE DUTIES

Tonnage taxes are doubled for all vessels of such size as to make them, if otherwise eligible, recipients of direct aid.

TITLE 3—CONCERNS IMMIGRATION

This title declares the policy of the United States to be that one-half of our immigrants shall be carried in American bottoms. The President is directed to take such steps as may remove treaty stipulations conflicting with this policy. When no conflict exists, the policy is to be carried out under regulations approved by the Secretary of Labor and Secretary of State.

TITLE 4—CONCERNS DIRECT AID MERCHANT MARINE FUND

A merchant marine fund is created from all tonnage taxes, 10 percent of all customs duties, and the direct aid refunded by owners who have made 10 percent profit or more in any one year.

THE CONTRACT

Section 403 authorizes the Shipping Board to enter into contracts for the payment of compensation. The contracts may run for 10 years and compensation shall be paid at reasonable intervals, not exceeding six months. The board may refuse for good reasons to enter into a contract on a vote of not less than five members.

The committee put in a proviso to that amendment relating to contracts, expressly providing that no contract shall extend beyond a period of 15 years from the enactment of this act. It was pointed out that under the language of the bill a contract might be made for 9½ years, and then renewed for 10 years, so that a contract might run for nearly 20 years. The committee inserted a proviso stating that no contract shall extend beyond the period of 15 years from the enactment of this act, which cuts out that possibility.

DETERMINATION OF AMOUNT OF COMPENSATION

The amount of compensation is based upon the distance steamed and the rate allowed per hundred nautical miles. The rate depends upon the size of the vessel and the speed of which she is capable, in the case of power-driven vessels, and upon the size alone in the case of sailing craft. Mileage is based upon chart distance between ports, except that a different distance may be allowed in special cases if the board deems it necessary.

The following requirements must be met by the vessels:

She must be maintained in the highest classification in the American Bureau of Shipping.

Two-thirds of her unlicensed crew must, after three years, be composed of American citizens, and the remainder must be eligible for citizenship. In the case of passenger vessels this does not extend to the steward's department.

She must be self-propelled over the mileage covered, except in cases of distress or in navigating harbors or inland waterways.

She must be built in the United States, except that certain vessels built before the enactment of the act may be admitted to compensation if registered under the American flag within three years and if five members of the board so vote.

She must be engaged in foreign trade as defined by the bill.

Certain feeder ships primarily serving the foreign trade of the United States are also eligible.

Three-fourths of the total fleet, owned, operated, or chartered by an owner receiving compensation, must be American.

VARIANCE OF RATE

The board may vary the rate of compensation set by the bill within limits of 100 percent either way upon a vote of not less

than five members of the board. According to the amendment recommended by the Committee on Commerce this will have to receive the sanction of Congress.

OBLIGATIONS OF COMPENSATED OWNER

An owner receiving compensation agrees that his vessels may be requisitioned in time of emergency upon a fair pre-emergency value. Sale of the vessel carries this obligation with it to the new owner. All repairs and renewals, other than distress repairs, are to be made in American ports.

The owner contracts to repay to the Treasury half of the amount by which in any one year his net income exceeds 10 percent on his invested capital until the amount of aid received by him in that year shall have been refunded. Detailed provisions are included for the administration of this section.

That, briefly, explaining it a little more, means this: Of course, it is not desirable, and it ought not to be the case, that compensation would be given to a vessel owner who is making a large profit in the operation of the ship. The committee does not desire that to be done. So we have provided that where the profit of the ship operator exceeds 10 percent in any year one-half of the excess comes back into the Treasury of the United States up to the amount of the compensation that may be paid.

TITLE 5—PERTAINS TO THE ARMY AND NAVY TRANSPORT SERVICE

Section 501 provides that where adequate commercial transportation exists military services may be discontinued by the President. The military departments are authorized to contract up to 10 years with commercial organizations for such services.

TITLE 6—PERTAINS TO RAIL AND WATER TRAFFIC CREATION OF THE JOINT BOARD

The creation of a joint board from the Interstate Commerce Commission and the Shipping Board is authorized. Such board is to make recommendations looking to the correlation of rail and water traffic.

I will say for myself that I feel that that is one of the most important provisions in the bill. I feel that if we are going to have a merchant marine upon a permanent basis, even with the aid here given, we must co-ordinate and bring into close co-operation the railroad water lines of the country.

EXPORT BILLS OF LADING

The Shipping Board is to authorize the form of bills of lading for the water-borne portion of a through shipment of goods where the Interstate Commerce Commission establishes the form for that portion of the shipment over American railroads.

RAIL-OWNED WATER LINES

This section amends paragraph 9 of section 5 of the Interstate Commerce Commission act to the end that railroads may own steamship lines where the latter do not come into possible competition with any rail lines.

AGREEMENTS BETWEEN CARRIERS

Section 605 amends the shipping act of 1916 so as to amplify the power of the board to investigate agreements between common carriers or between common carriers and terminals.

JOINT OR PROPORTIONAL RATES

Section 607 amends section 28 of the merchant marine act by making it mandatory on the Interstate Commerce Commission to invoke or suspend section 28 as the Shipping Board certifies adequate or inadequate American transportation is available. Where the board and the commission are of the opinion that section 28 will cause congestion or will deflect unduly the natural channels of trade, the section shall be suspended.

TITLE 7—COMPRISES MISCELLANEOUS DIVISIONS OFFICIAL TRANSPORTATION

Section 701 provides that the transportation of passengers and commodities paid for by the United States Government shall so far as practical be in American bottoms.

REPORT BY THE SHIPPING BOARD

The shipping act of 1916 is amended to include in the required annual report a complete report of the board's transactions with regard to the merchant-marine fund and the construction-loan fund.

One of the principal objections I have seen urged to the bill has been the failure to require the board to make these reports, but that provision was put in on the floor of the House, I think, and came over as a part of the House bill requiring them to submit the report.

HOME PORTS OF UNITED STATES VESSELS

The Secretary of Commerce is authorized to designate the port of documentation of American vessels, and such ports shall be

the ports where the greater part of the vessels' business is conducted.

SURRENDERED DOCUMENTS

The shipping act of 1916 is amended so that documents can not be surrendered in time of peace without the approval of the board.

REGULATIONS

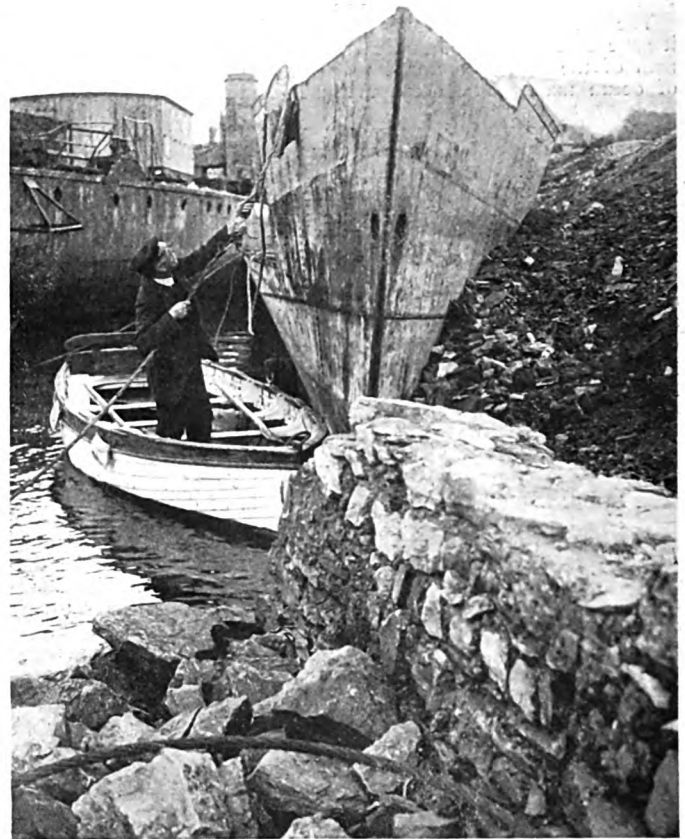
Section 703 authorizes the Shipping Board to make the necessary regulations to carry out the provisions of the act.

Hurricane Proves Reliability of Motorship

IN the recent hurricane that swept the North Atlantic, against which even the giant liner *Majestic* could only make 5 knots, the single screw motorship *Munmotor* of the Munson Steamship Company gave a splendid demonstration of the reliability of the Diesel engine. The *Munmotor* is one of the Lake type vessels having fuller lines than are considered satisfactory for the Atlantic service. She has a length of 253 feet and a beam of 43 feet 6 inches and is propelled by a McIntosh and Seymour 4-cycle Diesel engine of 900 brake horsepower.

Although a complete report of the voyage has not been received at this writing at the Munson Steamship offices, it is understood that heavy seas broke over the forward deck damaging the cargo hatch and admitting enough water to shift the cargo and give the vessel a decided list. It should be noted here that the vessel was fully loaded with 4,000 tons of bulk coal at the time but that, in spite of the damaged condition, she was able to ride out the storm safely and then proceed to her port of destination.

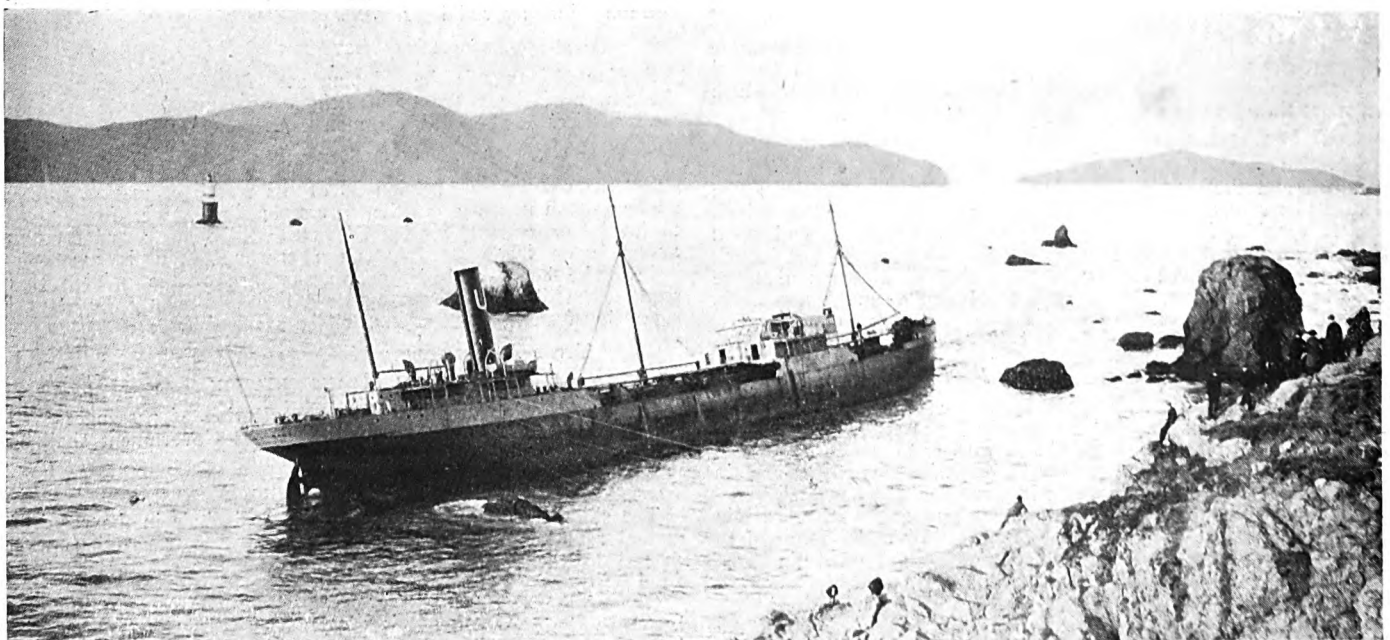
A thorough examination of the engine since the storm has shown the machinery to be in excellent condition, and the only damage found was where the straining of the ship had loosened a few joints in the pipe lines. The performance is all the more noteworthy due to the fact that the ship is fitted with a single screw installation depending solely upon one engine.



(Photograph by Kadel & Herbert, N. Y.)

Sea Wall Made from Scrapped War Vessels

A new use has been found for obsolete warships; instead of being broken up, they are towed into place, filled with stone and made a part of a sea wall. The illustration shows a one time "Jed" being worked into a sea wall at Dartmouth, Eng.



Wrecked Tanker Lyman Stewart on the Rocks North of Cliff House, Golden Gate

Following a head-on collision in the north channel of the Golden Gate at the entrance to San Francisco Bay during a dense fog recently with the Luckenbach steamer *Walter A. Luckenbach*, the Union Oil Company tanker *Lyman Stewart*, outbound to Seattle with 65,000 gallons of crude oil, was abandoned on the jagged rocks just north of the Cliff House, where, with a deep hole torn in her port side, she had been swept by the heavy ebb tide. The *Lyman Stewart* is of 5,919 net tons, built in 1914 at the Union Iron Works, San Francisco, Cal.

Sidelights on the Shipping Bill

By "Old Scotch"

"Well begun is half done" is an old adage, applicable to many undertakings in life and particularly so to the shipping bill now in the process of transformation into the law of the land. To one who attended the sessions of its turbulent passage through the House of Representatives there are a number of interesting sidelights not covered in the press reports, some of which are outlined in this article.

THE outstanding impression one gained from the onslaughts of the opponents of the ship subsidy bill is their absolute selfishness and unfairness to the maritime interests of the country.

The term "subsidy," wished on the measure by its opponents, was anathematized to a fare-ye-well. In itself the term means nothing of the sinister definition applied to it. The word "tariff" means just the same thing, so far as the effect is concerned.

HYPOCRISY OF THE OPPONENTS

Much of the bitter invectives hurled at the shipping bill came from members in the West and Northwest, who but a few weeks ago were imploring the House to place duties upon agricultural and other products of their particular districts. The opponents from the South, who were the most active in their denunciation of this alleged "raid upon the Treasury," are always in the front rows begging for large appropriations for "good roads," "rural free delivery," "boll weevil cures," "pellagra funds" and what not, because, forsooth, they were beneficial to their particular districts. Has anyone ever heard of the representatives of districts interested in shipbuilding and ship operation ever opposing measures of that kind, even though their districts received no particular benefits from such legislation?

Millions of dollars have been spent for reclamation of arid lands, to benefit the agricultural interests of the great West. Is not that a subsidy? and a beneficial one at that? The maritime interests have always lent their aid to all of these meritorious projects, else they never could have become laws.

AID FREELY GRANTED FOR BUILDING RAILROADS

If we want to confine this argument to means of transportation, which is all that the shipping bill calls for in fact, let us but harken back to the days a half century or so ago, when the great transcontinental railroads were built. Private capital could not be enlisted in these great undertakings, because they would not pay attractive or, in fact, any interest rates. But the great object to be accomplished was so transcending that our representatives then in Congress, and real statesmen, too, granted vast acreages of the public domain and guaranteed the bonds necessary for the construction of these roads. Has the Government ever made a better disposition of its lands and its credit? Is there any marked difference between starting these lines of communication on the land, than there is in this proposed establishment of lines on the seas? A nation's shipping is but the continuance of its rail facilities on land.

The great middle states of Ohio, Indiana and Illinois supported the measure valiantly, and their representatives in the House made some of the best speeches in its favor. Can their interests be any different than those of the representatives of Iowa, Minnesota and Wisconsin? As a body they are apparently as intelligent. Their opposition must therefore be attributed to innate selfishness, for those particular states have been the most insistent for high tariffs on their wheat and other products of the soil. The consumers of the greatest portion of their crops are located in the great centers

of population along the Eastern seaboard. We who live here and wrest a livelihood from the business of sea transportation do not care particularly to have the price of our daily bread greatly increased by the tariff in order that the farmers of Iowa and Minnesota may make a living wage from raising wheat and corn, but we realize that our agricultural interests must be made remunerative in order that the country may be prosperous, and we accept the conditions placed upon us by Congress cheerfully.

We who build and operate ships have as much right to have our occupations protected as have the farmers. You cannot place a protective tariff on ships sailing the Seven Seas in open competition with all the world, so our only means of protection is for the Government to help us make up the difference in labor costs between the American standard and the standards of our low cost labor competitors on the ocean.

SELFISH ATTITUDE OF AGRICULTURAL REPRESENTATIVES

Do the representatives of the farmer districts realize that, if this shipping bill, or something equal to it, is not passed and very soon, it will mean the closing of over 75 percent of all the shipyards in this country, and the throwing out of employment of thousands of men? Have they forgotten that the disarmament program, which eventually must benefit the whole world, has already thrown out of employment not less than 25,000 men who were and have been from youth employed in shipbuilding? Are these men and their families alone to bear the brunt of a policy which benefits all other of the great industries in the country? Must one industry such as this be annihilated and the honest men, who have heretofore gained their livelihood in shipbuilding, be thrown out on the streets, because of a spirit of selfishness and unfairness on the part of certain of our agricultural representatives in Congress who would take away their last chance of employment by denying the shipping interests that which is their just due?

Most of us have been taught that the American farmer is our highest type of citizen, both in patriotism and intelligence, the very backbone of our citizenry. We still believe it, but if their elected representatives, who frothed at the mouth at the very mention of a measure to help the shipping industry, reflect the sentiments of their constituents, it must be because of an absolute lack of knowledge of the actual conditions. If every farmer in the United States has carefully read President Harding's recent message on the shipping situation, there ought to be some new faces in Congress from certain Western districts two years hence, and undoubtedly there will be.

SHIPPING AS A MEANS OF NATIONAL DEFENSE

Another outstanding feature of the six days' debate was the subordination of that phase of the shipping situation, connected with our national defense. The commercial side is of great importance naturally, but the preparedness side of the issue should have been given greater prominence than it received. The clause regarding payments to the so-called "Industrial" ships was unceremoniously stricken from the bill, because the names of Standard Oil and United States Steel Corporation were included among the beneficiaries. Of

course it would take a pretty brave Congressman to explain to his constituents that he had voted to pay money to either of these great, wealthy concerns for carrying on their own business. From the strictly commercial side of the bill it must be admitted that the average citizen would require a lot of demonstration to believe it advisable. Not, however, if he would view it from the broad standpoint, that the money for operating these ships could be kept at home by the small payments authorized in the bill. In domestic trade a few cents added to the cost of gasoline would soon make up any differential in operating costs. But when these great oil companies go into the foreign trade, they must meet very keen competition.

TANKERS ESSENTIAL IN WARFARE

It is from a standpoint of national defense that this great fleet of tankers should be considered. If Government help is not extended to those operating in foreign trade, it is a foregone conclusion that they will either be tied up and soon deteriorate, or else they will be transferred to foreign flags, where most of them were before the outbreak of the great war. No type of merchant ship is more valuable to the Government than tankers, in time of war. Whether hostilities are conducted on the surface of the ocean, underseas, or in the air, vast quantities of fuel oil and gasoline will be required, and will be as indispensable as explosives. Without a large fleet of tankers ready at a moment's notice, we would be helpless to conduct any kind of war, even though the scene of action was within our own borders.

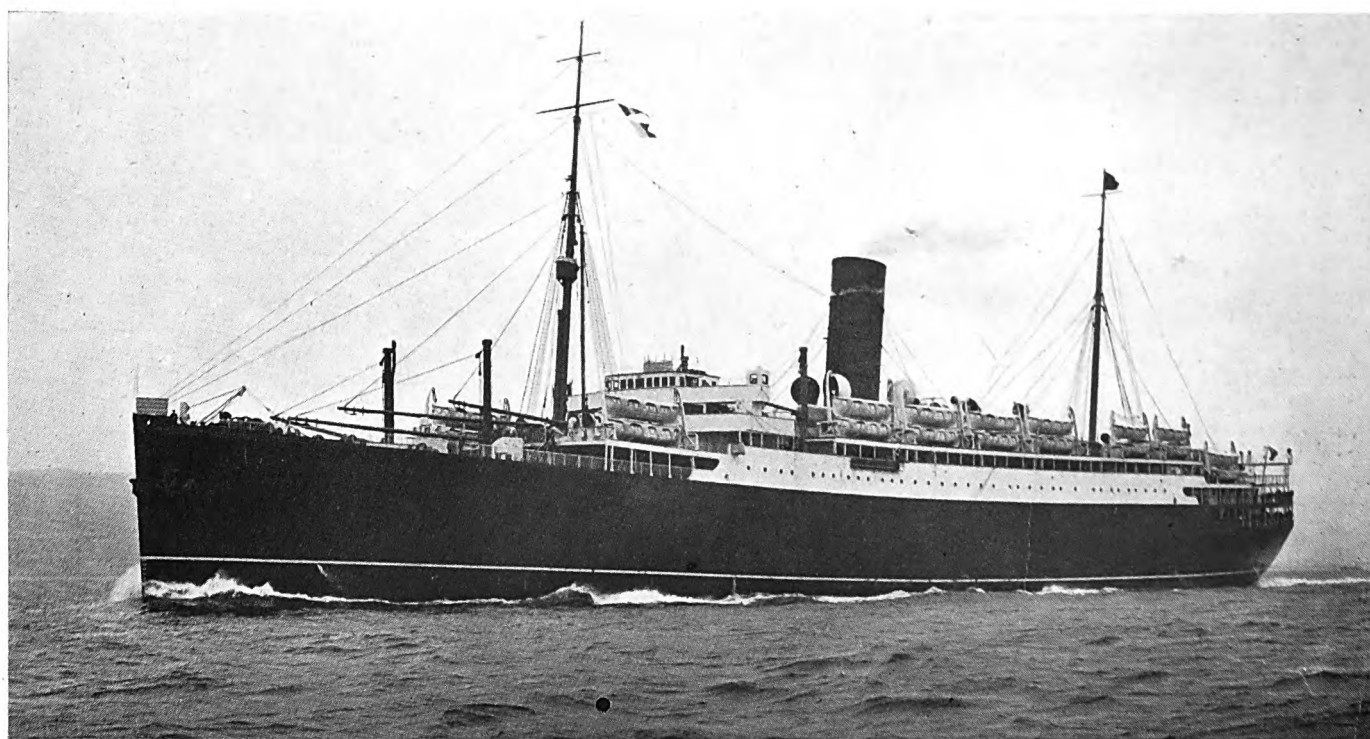
At a certain stage of our own part in the last war, such oil carriers would have been worth \$10,000,000 each, as it will be remembered that our fleet was very small at the outset of our entry into the war, and several of the largest tankers were sunk by submarines. There seems to be but little chance of having the "Industrial" fleet compensation put back into the bill in the Senate. Hence the prejudices of

certain of our misguided Solons, may eventuate some day in a national calamity.

LESSONS OF THE WAR MUST NOT BE FORGOTTEN

This only illustrates the general tenor of our lawmakers' attitude at this time. So far as many of them are concerned the late war might have happened fifty years ago instead of but five. So far as our dependability on merchant shipping is concerned the lessons of that great conflict have already been forgotten. The nearly four billions of dollars which were then feverishly invested in improvising a merchant fleet, to make up our delinquencies for the past fifty years, could have been mostly saved to the taxpayers, by the payment during that period of an average of \$5,000,000 annually in aid to our merchant shipping. Now and for many years to come the taxpayers of this country will be burdened with a tax of not less than \$150,000,000 annually, to pay the interest alone on that portion of our debt incurred in building ships. Who can tell how long it will take to pay off the principal? What a monument to Congressional short-sightedness! What a commentary on sectional selfishness and unfairness!

But there is still hope that we may overcome a repetition of such foolhardiness. The passage of the bill in the House by the comfortable majority of 24 votes marks the first time in history that the lower House has ever passed legislation of this kind. The thorough debate and the wide publicity given to the President's able message on the subject must have some good effect. In spite of the dire threats of certain elements in the Senate to defeat the measure, the American people certainly will not see this measure defeated. If the public will but think of the lessons of the past, and insist on their representatives in the Senate rising above selfish and provincial ideas, the bill will yet become a law, crippled although it may be. The bill is a constructive piece of legislation and should pass without delay.



Cunard Liner Tyrrenia, Built and Engined by William Beardmore and Company, Ltd., Dalmuir, Glasgow, Scotland

This vessel is a twin screw, double reduction, geared turbine, oil burning steamer, 580 feet in length, 70 feet in breadth, of 17,000 tons gross, 13,500 shaft horsepower, and 17 knots service speed. She has accommodations for 265 first class, 370 second class and a large number of third class passengers. In common with all Cunard Line ships built since the close of the war, space is economized greatly by the adoption of geared turbine machinery and oil fuel, which allows power to be increased and calls for only one large funnel, thus leaving much valuable amidships space for the use of passengers.

Recent Developments in Marine Insurance

Instructions to Salvage Branches—Lightning Covered—War Risk Refunds—Ship Repairs Liability—Lake Cover Extended

By "Bordereaux"

FOLLOWING the final report of the cargo underwriting conferees to the Shipping Board authorities, extended allusion to which was made in this department last month, the United States Salvage Association has issued explicit instructions to all its branch offices outlining the service expected of them in order that the association may fully realize the hopes of the board and the underwriters in the matter of co-operative efforts to maintain a high standard in the condition of the board's vessels. By the terms of the report, it will be remembered, the responsibility was placed fairly upon the shoulders of the Salvage Association for seeing that the upkeep of the boats is maintained on a basis that warrants the continued granting of the "liner" and "approved steamer" ratings already arranged by the underwriters. Those ratings are to be conditional upon the maintenance of a standard of upkeep that meets with the approval of the Salvage Association. In its instructions to its branch offices the home office of the association insists upon the greatest care in considering the following factors:

(1) It must be seen that each vessel trading out of each branch's district does not put to sea in an overloaded condition. Cases of overloading must be promptly reported to the association's home office, to the agents of the locality, and to the Shipping Board authorities for action.

(2) Periodical surveys will serve as a medium for determining the physical condition in which these vessels are being maintained, but they must be followed up to ascertain if the recommendations of these surveys are carried out. The home office must be immediately notified of any failure to carry out the recommendations. These condition surveys should be made to cover in addition to the information called for therein any other feature of construction or operation which would materially detract from the vessel's cargo-worthiness or improve her standing in that respect. Such recommendations would cover such items as unprotected sanitary and scupper pipes, insufficient ventilation in cargo holds, the removal of steam and exhaust lines from cargo holds when such a step is advisable for the safe carriage of dry and perishable cargoes, unprotected steam pipes, unsheathed bulkheads on tanks carrying fuel oil, and other similar items. Such items as these must be brought to the particular attention of the operators, the local Shipping Board office, and also to the attention of the home office, together with the necessary recommendations for their correction. When urgency dictates, telegraphic information on such points is to be resorted to, in order that the least possible delay may be had.

(3) One of the original recommendations of the Cargo Conference Committee expressed approval of the desire of the Shipping Board to eliminate the shifting of personnel on its vessels, and particularly stressed the point that the chief engineers should follow their ships. It is therefore expected of the branch offices that whenever any of the designated ships are under their observation they shall acquaint themselves with the character of the personnel, particularly as respects the feature just mentioned.

The home office is to issue periodical bulletins which will advise the underwriters of the status of each of the vessels comprising these various fleets. It is therefore necessary that prompt information be forwarded with respect to any shortcomings in any of the vessels trading out of each branch's

district. The concluding language of the instructions is as follows: "We shall place upon your office the responsibility for the condition of any of these vessels leaving your district, and for the manner in which cargo is carried, in the sense that cargo damages resulting from defects in the condition of these vessels, which should have been eliminated before sailing, must be eliminated."

Lightning a Sea Peril

IN a recent opinion under an inland marine policy as to the liability of underwriters for loss by lightning doubt was expressed by a prominent admiralty lawyer as to whether the insurer could be held responsible, and the result has been to arouse so much uncertainty in the minds of brokers and the assured that frequent requests are being made to underwriters to include the word "lightning" in the perils clause of the policy.

The absence of decisions on the subject by the courts seems to have worried the lawyer, but the view of the underwriters is that the paucity of interpretation of the subject arises from the fact that lightning is a peril that would never be called into question by them. It is possible that the specific inclusion of lightning in fire policies has led to confusion in the minds of some, but it takes but little thought to appreciate that there is but the slightest analogy in scope between the perils clause of a marine policy and the single hazard of fire in a fire policy. Not only does the former specifically cover fire, but it includes loss or damage from all perils of the sea. The fortuitous nature of the happening is vital. It is, in the language of an authoritative court, "something which could not be foreseen as one of the necessary incidents of the adventure." This is, in point of fact, an excellent definition of lightning.

While it may be argued that it is not peculiar to the sea, it nevertheless remains that such a test is not applicable to sea perils, no more than winds would be. Nor can a parallel be drawn with rainwater damage, which is held not to be a peril of the sea; rain is a usual and necessary incident of the adventure, and damage from it can be foreseen and prevented with ordinary precaution, and that element of care enters into packing and handling of goods. In the judgment of most underwriters there is no question of the inclusion of lightning in the term "perils of the sea," constituting, as it most certainly does, a fortuitous happening.

Low Hull Rates

UNDERWRITING hulls is now going on briskly, with accounts being made up to attach January 1. Complaints are general, on both this side of the Atlantic and the other, of low valuations and the continuance of high repair costs. It is stated in England that the insured value of a modern tramp steamer of over 1,000 tons is based on about £8 to £10 per ton, and that risks have been placed on values as low as £6 per ton. Save in only exceptional instances the £15 and £20 valuations of a year ago are unheard of today. In the present condition of the shipbuilding industry there is believed to be no profit in such rates and values as now obtain. Underwriters rest their sole hopes

in possible reductions in repair costs, and this has been promised in England, if the proposed reduction in shipyard wages becomes an accomplished fact, and that appears certain now.

Would Reclaim War Risk Premiums

THE close of the year was signalized by a widespread movement among American importers and exporters to lay the foundation for a demand upon the German Government for the return of war risk premiums paid by the former during the period of 1914-1918, on the ground that this was an expenditure caused by the operations of German submarines and cargo-raiders. There are hundreds of millions of dollars of German funds sequestered in this country, and the idea was to press for recovery from this vast sum and to make use of the United States Government's special commission on redeemable war costs for the purpose. The time limit for presenting claims to this commission expired with the year, hence the importunities of numerous brokers during December for their underwriters to supply them with statements of their clients' war risk premium payments. This finally developed into the greatest sort of a nuisance to the insurance men, already overworked with the year-end special duties, and many offices made a charge for the extra work of 10 percent of the premiums, and some even added a \$20 bonus for good measure.

It is the practically unanimous opinion of the underwriters that this movement is a great mistake, that it is wrong in principle, unjustifiable, and with next to no likelihood of resulting successfully. They insist that the war risk premiums were, at the time, passed along to the consumers, and that the insured therefore have never been out of pocket because of them. Furthermore, the underwriters fear that, if such claims were allowed, it would greatly prejudice the subrogation rights of the insurance companies. They feel there could be no effective reply to the possible objection of the German Government that as the assured had already received back their war risk premiums there was nothing due the underwriters, in view of the fact that they had accepted the risk at a rate acceptable at the time and so must have felt themselves properly reimbursed for the hazards involved. As a matter of fact, the second half of this argument is so strong that many underwriters seriously question the wisdom of they themselves undertaking to lodge claims for war risk losses against Germany. The whole subject is as applicable to the insurance interests of ship owners and ship operators as to those of the merchants who have been making such an ado over it.

Lake Cover Extensions

NAVIGATION on the Great Lakes closed on December 12, but by special arrangement insurance coverage was extended somewhat beyond that date this season. The move originated in London where additional periods of coverage were allowed to certain Canadian fleets in consideration of an extra premium of one-half of one percent. American underwriters felt that this was an unfair advantage to the Canadians, and a special committee of the American lake underwriters decided to make a like charge for an additional period of three days, from midnight of December 12 to midnight of December 15, with the intimation that a further extension might be made if it should appear desirable. But they later decided to go no further than the 15th, and it is probable that the attitude of the Great Lakes Protective Association had a great deal to do with this determination. The Advisory Committee of the latter body held a special meeting on the subject and unanimously disapproved of any extension whatever; however, they reluctantly concluded to "follow the regular underwriters up to midnight of December 15th," but positively refused to go beyond that date.

The Association represents about three-quarters of the cargo tonnage of the Great Lakes, and they carry 25 percent of their own insurance. The more conservative members always lay up their vessels after December 12, and that element naturally was averse to taking chances for the benefit of the more reckless minority. When their decision was made known to the underwriters all talk of further unrestricted sailings ceased forthwith. It might be added that there is always a dangerous come-back to chance-taking with post-season storms. Last year underwriters felt jubilant over their lake experience in mid-December, only to see most of their profit melt away under the influence of subsequent reverses. Thus this year, after a fairly successful season, tremendous drain on the profits was had in consequence of heavy lighter losses sustained in the period of two weeks.

Refund of Ship Repairs Duties

UNDERWRITERS are somewhat anxious and considerably at sea over the problems involved in the insurance liability for the 50 percent ad valorem duty provided for in the new tariff act on repairs made abroad to American ships. Evidently the same question has perplexed London, for the Institute of London Underwriters has written to the Board of Underwriters of New York asking for the comments of American underwriters on the subject, and particularly as to whether the 50 percent duty would be claimable under hull policies. A committee of the New York Board is co-operating with Manager L. J. Brengle, representing the American Marine Insurance Syndicates, in securing legal advice on this question. The lawyers are now engaged in the preparation of their opinion.

There are two sections of the new tariff which have given rise to the discussion—Section 3114 and Section 3115. Underwriters feel that the language is ambiguous, and that there will have to be definite Treasury rulings before insurers or ship owners can determine to what extent duty is payable. They want to know just what is intended by the term "stress of weather or other casualty." Again, the act appears to limit refund of duty to cases where the vessel has *put into* a foreign port, but does not make mention of accidents *while at* a foreign port. Further, the act provides that duty is refunded on such repairs as are necessary to secure the *safety of the vessel to enable her to reach her port of destination*. Hence the query, what of the case where a vessel is able to reach her port of destination abroad, but must make repairs to enable her to complete her return passage? In such instances will our Government refund on all repairs made necessary to complete a return passage with cargo? Again, what is the proper meaning of the term "destination"?

In early December certain amendments were promulgated by an Assistant Secretary of the Treasury, but these were merely to elucidate customs procedure and in the nature of instructions as to methods to follow; underwriters dismiss them as throwing no light upon the problems above outlined, and await the advice of their counsel and pertinent Treasury rulings.

Negligence Voids General Average

THERE is no application of the doctrine of general average when the necessity for the sacrifice was caused by the negligence of the master or the crew. Such is the decision made in the *Mary F. Barrett* case, 270 Fed. Rep. 618. Before the Harter Act was passed ship owners were unable by contract to relieve themselves of liability for such negligence. That act exempts vessels from liability for losses due to errors of navigation, but does not entitle them to general average contributions for losses resultant therefrom.

If there is no stipulation in the charter-party entitling the ship to general average contributions on this account, a stipulation authorized under the Harter Act, the vessel cannot, on a libel for part of the cargo jettisoned because of the stranding of the ship resultant from errors of navigation, interpose the right to general average as a defense *pro tanto*.

Buffalo Lay-ups

BECAUSE of the serious losses sustained by the breaking of the Buffalo breakwater last winter, underwriters have disapproved of that port for the laying up of vessels and have imposed an added three-quarters of one percent for coverage there. The Great Lakes Protective Association has taken this very much to heart and has pronounced it unjustifiable. They object to the dictum of the insurers that the berths be limited to fifty-five, and urge a further extension of the mooring space. They also ask that if this additional premium must be paid it should be on a pro rata basis with a minimum lay-up of fifteen days. Otherwise, they insist, no differential exists as between a season lay-up and one for a week.

The Maritime Association of the Port of New York to Celebrate Fiftieth Anniversary On February 5

THE Maritime Association of the Port of New York will celebrate its fiftieth anniversary with a banquet at the Hotel Astor on February 5. This body today is one of the most powerful organizations in the shipping industry in the Western Hemisphere.

For some years prior to 1872, a number of merchants interested in shipping congregated at the corner of William,

The rooms of the new organization, owing to its increased membership, soon became inadequate and an agreement was made with the Merchants' Exchange and News Association to rent for three years, from May 1, 1874, to May 1, 1877, the ground floor of 66 Beaver street, running through the



C. H. Potter, President

Produce Exchange. On May 1, 1875, the Maritime Association purchased the stock of the Merchants' Exchange and News Association and the membership was increased to 1,000.



John Dowd, Vice-President



W. F. Firth, Secretary



A. M. Campbell, Treasurer

South William and Beaver streets (sometimes called the downtown "Five Points"). In the latter part of 1872 it was suggested that a room be engaged in that vicinity. The idea met with very favorable response, and within two weeks, ending January 16, 1873, 140 firms had signed their names to the subscription list to defray the expenses of the new enterprise. The Maritime Association of the Port of New York was then formally organized and rooms engaged at 61 Beaver street, the formal opening being held on February 5, 1873, at 3 p. m.

In 1903 negotiations were made to purchase the property at 78-80 Broad street which proved successful and on January 5, 1904, the formal opening of the new quarters was celebrated by the first banquet of the association, which was held on the floor of the exchange.

On April 25 of this year the list of membership was raised from 1,200 to 1,500 to further increase the scope of the organization by additional members in the fast growing field of shipping. There are at the present time 127 shipping and allied trades represented in its membership.

Shipbuilding in the United States in 1922

Private American Shipyards Delivered 303,433 Tons of Shipping Last Year—503,238 Tons Now Under Construction

ADVERSE financial and business conditions abroad, coupled with the Naval Disarmament program entered upon in 1922, have wrought havoc in the activities of American shipyards during the last year and their output of vessel tonnage has dropped to the average of pre-war years when their facilities for building ships were far less extensive than they are now.

During the year just ended, private American shipyards turned out a total of 256 vessels of over 100 gross tons each, aggregating 303,433 tons. Of this output, 230 were merchant vessels of 282,938 gross tons and 26 were naval vessels of 20,495 tons. The output of the individual yards is shown in the table on the opposite page.

Of the tonnage built, approximately 67 percent was turned out on the Atlantic and Gulf coasts, 11 percent on the Pacific coast, 8 percent on the Great Lakes and 14 percent in the Mississippi Valley, as follows:

Distribution of Shipbuilding in 1922

District	Tonnage	Percent
Atlantic and Gulf Coasts.....	204,257	67.3
Pacific Coast	33,143	11.0
Great Lakes	23,223	7.7
Mississippi Valley	42,810	14.0
Total	303,433	100.0

TONNAGE NOW UNDER CONSTRUCTION

The volume of tonnage now under construction in private American shipyards aggregates 503,238 tons, of which 233,096 tons are merchant vessels of over 100 gross tons each and 270,792 tons are naval vessels. Approximately 65 percent of the work now in hand is being built on the Atlantic and Gulf coasts, 11 percent on the Pacific coast, 14 percent on the Great Lakes and 10 percent in the Mississippi Valley, the tonnage being distributed as follows:

Distribution of Shipbuilding on January 1, 1923

District	Tonnage	Percent
Atlantic and Gulf Coasts	328,315	65.0
Pacific Coast	56,224	11.2
Great Lakes	69,250	13.8
Mississippi Valley	49,449	10.0
Total	503,238	100.0

As compared with the present volume of tonnage under construction, there were building in private American shipyards a year ago 792,976 tons of shipping, comprising 322,680 tons of merchant vessels and 460,296 tons of naval vessels.

LEADING SHIPYARDS

Considering the volume of output of the individual shipbuilding companies, the leading position last year was held by the Bethlehem Shipbuilding Corporation, Ltd., with a total output of 126,242 tons of both merchant and naval vessels. The New York Shipbuilding Corporation was second with an output of 32,622 tons comprised wholly of merchant vessels.

This year the Bethlehem yards again lead with a total of 155,092 tons of vessels under construction and the New York Shipbuilding Corporation is second with a total of 80,132 tons. In both cases the work includes both merchant and naval construction, the various yards of the Bethlehem Shipbuilding Corporation, Ltd., having 41,700 gross tons

of merchant vessels under way and 113,392 tons of naval vessels while the New York Shipbuilding Corporation has 12,132 tons of merchant vessels under construction and 68,000 tons of naval vessels.

Considering merchant vessels only, the American Shipbuilding Company on the Great Lakes is in the lead with a total of 46,200 gross tons under construction as against the Bethlehem yards with 41,700 tons of merchant work. The company with the third largest volume of vessel tonnage under construction is the American Bridge Company, which is building 34,180 gross tons of barges.

CONTRACTS PLACED IN 1922

Over \$32,500,000 worth of new vessel construction was placed in American shipyards during 1922, according to data compiled from the records published in our columns from month to month. In the list of new steamship contracts, the most important placed during the year included two passenger steamers for the Cleveland and Buffalo Transit Company to cost approximately \$6,000,000; three freight ships for Great Lakes service, \$2,400,000; four Diesel electric dredges for the United States Government, \$2,528,240; two passenger ships for the Seaboard-Day Line, \$2,000,000; two passenger ships for the Savannah Line, \$1,840,000; two passenger ships for the Merchants and Miners Line, \$1,700,000; three ferries for the city of New York, \$1,589,900; a new steamship for the Inter-Island Steam Navigation Company, \$1,027,000; two ships for the United States Steel Products Company, \$1,000,000 and a new steamer for the Pacific Cable Company, \$1,000,000.

In addition to new vessel construction, American shipyards received contracts during 1922 for nearly as much vessel reconditioning work. A total of more than \$84,981,517 worth of vessel construction and reconditioning work in contemplation was reported in our columns during the year and over \$50,242,824 in contracts placed for similar work.

PROSPECTS FOR 1923

Unmistakable signs indicate that the year 1922 marks the low point in shipbuilding in the United States and that 1923 will produce a considerably larger amount of construction. Among the first contracts to be placed with American shipbuilders in 1923 are those for two passenger ships for the Eastern Steamship Company at a cost estimated at \$4,000,000; a new passenger and freight ship for the New York and Porto Rico Line, \$1,500,000; and a new passenger and freight ship for the Clyde Line which is expected to cost in excess of \$1,000,000. From present indications the contracts for these vessels will be placed during the first half of the new year.

In addition to this new construction work, which at the present time seems practically assured if present plans are carried out, \$6,500,000 worth of ship reconditioning work, involving the steamships *Agamemnon*, *Mount Vernon*, *President Grant* and *America*, will also be in the hands of American shipbuilders during the early part of 1923. It is also evident that 1923 will bring forth not only additional seagoing vessels but river and harbor craft as well, there being a strong tendency in those localities requiring shallow draft steamers to dispense with wooden vessels in favor of steel.

TWO DIESEL LIGHTSHIPS PLANNED

The construction of two lightships propelled by Diesel

American Shipbuilding Returns for 1922

Shipyard	Merchant Vessels Completed in 1922			Naval Vessels Completed in Private Yards in 1922			Merchant Vessels Now Under Construction			Naval Vessels Now Under Construction in Private Yards		
	Number of Ships	Total Gross Tonnage	Total Horsepower	Number of Ships	Total Displ. Tonnage	Total Horsepower	Number of Ships	Total Gross Tonnage	Total Horsepower	Number of Ships	Total Displ. Tonnage	Total Horsepower
American Bridge Company.....	52	18,380	2,400	.....	.....	.....	78	34,180	32,800	.....	.....	.....
American Shipbuilding Company.....	1	8,500	2,400	.....	.....	.....	6	46,200	.....	.....	.....	.....
Ballard Marine Railway Company.....	4	2,800	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bath Iron Works, Ltd.....	2	1,550	800	.....	.....	.....	5	3,900	2,400	.....	.....	.....
Bethlehem Shipbuilding Corporation, Ltd.....	14	112,326	53,350	16	13,916	1,800	14	41,700	21,100	18	113,392	420,000
Consolidated Shipbuilding Corporation.....	.....	.....	.....	3	2,575	.....	.....	.....	.....	5	35,500	450,000
Wm. Cramp & Sons Ship & Engine Building Company.....	3	2,046	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Defoe Boat & Motor Works.....	200	.....	160	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dravo Contracting Company.....	50	10,892	.....	.....	.....	.....	36	6,280	400	.....	.....	.....
Dubuque Boat & Boiler Works.....	3	700	800	3	.....	800	2	290	400	.....	.....	.....
John Eichley, Jr., Company.....	2	850	.....	.....	.....	.....	2	250	400	.....	.....	.....
Federal Shipbuilding Company.....	6	11,380	3,100	.....	.....	.....	4	13,400	6,900	.....	.....	.....
Great Lakes Engineering Works.....	1	8,239	1,900	.....	.....	.....	2	8,700	2,700	.....	.....	.....
Great Lakes Towing Company.....	.....	.....	.....	.....	.....	.....	1	1,200	.....	.....	.....	.....
Howard Shipyard.....	.....	.....	.....	.....	.....	.....	2	995	.....	.....	.....	.....
Humphreys R. R., Inc.....	1	250	300	.....	.....	.....	.....	.....	.....	.....	.....	.....
Johnson Dry Docks & Shipbuilding Company, Inc.....	9	1,344	.....	.....	.....	.....	5	1,000	800	.....	.....	.....
J. C. Johnson.....	2	1,315	.....	.....	.....	.....	1	3,000	.....	.....	.....	.....
Johnson Shipyard.....	5	5,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kelley Spear Company.....	.....	.....	.....	.....	.....	.....	2	1,900	.....	.....	.....	.....
Kyle & Purdy, Inc.....	2	315	320	.....	.....	7,200	.....	.....	.....	.....	.....	.....
Lake Torpedo Boat Company.....	.....	.....	.....	4	4,004	.....	.....	.....	.....	.....	.....	.....
Los Angeles Shipbuilding & Dry Dock Company.....	.....	.....	.....	.....	.....	.....	2	3,500	2,500	.....	.....	.....
Main Iron Works.....	1	.....	1,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
Manitowoc Shipbuilding Corporation.....	2	5,347	1,500	.....	.....	.....	1	150	700	.....	.....	.....
Marietta Manufacturing Company.....	7	1,950	400	.....	.....	.....	9	3,275	.....	.....	.....	.....
Merchant Shipbuilding Corporation.....	3	16,091	9,800	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nashville Bridge Company.....	17	6,100	435	.....	.....	.....	6	1,824	350	.....	.....	.....
Newport News Shipbuilding & Dry Dock Company.....	2	1,008	1,800	.....	.....	.....	2	7,000	5,800	.....	32,600	28,500
New York Shipbuilding Corporation.....	10	32,622	21,750	.....	.....	.....	4	12,132	5,200	2	68,000	209,700
Pusey & Jones Company.....	3	3,568	6,500	.....	.....	.....	5	3,840	7,200	.....	.....	.....
Jas. Rees & Sons Company.....	2	700	500	.....	.....	.....	1	500	250	.....	.....	.....
Staten Island Shipbuilding Company.....	4	5,802	6,100	.....	.....	.....	1	6,650	7,150	.....	.....	.....
Sun Shipbuilding Company.....	11	17,946	9,600	.....	.....	.....	11	11,000	7,850	.....	.....	.....
Tebo Yacht Basin.....	.....	.....	.....	.....	.....	.....	3	4,500	2,250	.....	.....	.....
Toledo Dry Dock & Construction Company.....	1	677	1,200	.....	.....	.....	1	13,000	2,700	3	21,300	270,000
Toledo Shipbuilding Company.....	1	1,010	.....	.....	.....	.....	2	.....	.....	.....	.....	.....
Union Construction Company.....	3	512	728	.....	.....	.....	1	225	200	.....	.....	.....
Vinyard Shipbuilding Company.....	4	3,238	4,100	.....	.....	.....	8	1,855	800	.....	.....	.....
Charles Ward Engineering Works.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	230	282,938	130,193	26	20,495	9,800	221	232,446	116,050	29	270,792	1,378,600

engines and equipped throughout with electrically-driven auxiliaries is contemplated by the Bureau of Lighthouses of the Department of Commerce, Washington, D. C.

According to the annual report of the Commissioner of Lighthouses to the Secretary of Commerce the increasing need of additions to the vessels of the Lighthouse Service will involve an expenditure of approximately \$3,260,000 during the next three years for new vessel construction and appropriations for a part of this program will be requested at once.

VESSELS FOR WESTERN RIVERS

Appropriations, totaling approximately \$1,000,000, are expected to be available for work in the Mobile district of the War Department during 1923. The Engineer Office in that district has under construction at the present time a 100-foot Diesel electric stern wheel tug with steel hull having a length overall of 119 feet, beam, molded, 23 feet and depth, 5 feet. The contract for the construction of this vessel was recently awarded to the Charles Ward Engineering Works, Charleston, W. Va., for a total of \$89,000. The same office has also recently placed contracts for the construction of 62 hydraulic pontoons at a total cost of \$22,568 and expects to advertise for bids during the early part of 1923 for the construction of 7 steel barges, 100 feet by 25 feet by 5 feet and has plans under course of preparation for a steel derrick boat.

MOTORSHIPS CONTEMPLATED

The Atlantic and Western Steamship Company, commonly known as the Nawasco Line, which is engaged in coastwise service between the Atlantic and Pacific coast ports of the United States, contemplates the purchase of vessels from the Shipping Board for conversion to Diesel propulsion.

The Rochester Terminal and Canal Corporation, Rochester, N. Y., it is understood, is planning the construction of new barges and the conversion of coal burning tugs to either oil burning or Diesel equipment.

The United States Engineer Office, Portland, Ore., contemplates the construction of two steel dump scows, each 70 feet long, 22 feet wide and 6 feet deep, and the Engineer Office, Jacksonville, Fla., is planning to construct three steel barges, each 80 feet by 26 feet by 5 feet, and a motor dredge tender.

It is learned that the Port Huron and Sarnia Ferry Company, Port Huron, Mich., contemplates the purchase of a boat with a capacity of from 750 to 1,000 passengers for ferry service, to be ready for operation in the spring.

While there is a possibility that S. Sgitcovich & Company, steamship agents and operators, at Galveston, Tex., may acquire ocean tonnage in the near future, definite action has not yet been decided upon.

The Goodrich Transit Company, Chicago, Ill., while having no definite building program in view for new vessels, is considerably interested in fuel oil burning. Several passenger vessels on the Great Lakes are being converted from coal to oil this winter and the Goodrich Company will probably watch with interest the results of these conversions.

British Shipping and Shipbuilding in 1922

**Obsolete Tonnage Greater Than Most People Believe
—Rush of New Contracts in Final Quarter Significant
That Trade Improvement Will Increase Building Costs**

By W. H. Wendon

SHIPOWNERS and shipbuilders of the United Kingdom enter 1923 with measurably more hope in their minds than when they embarked on the year through which we have just passed. 1922 started badly, and retained a deplorable slumpiness for the greater part of its natural course, but fortunately towards the close of the year a brighter aspect ruled—hence the feeling of better times in store in the not too distant future. Not that *all* owners and builders hold this view; on the contrary, there are some who see nothing but gloom in the year which lies before us. What has given rise, more than anything else, to the conflicting opinions which now obtain in shipping circles is the advisability or otherwise of certain owners who have deemed it expedient to contract for new vessels.

These new contracts—so conspicuously few in the earlier months—came with somewhat of a rush in the final quarter. The owners were apparently uninfluenced by the still enormous quantity of steamship tonnage laid up in various parts of the world (the amount of merchant shipping laid up all over the world is estimated at round about ten million tons gross) and the fact that rates of freight remain on an unremunerative level.

Some shipbuilders are willing to accept as low as £8 10s. per ton deadweight for a steamer to carry 8,000 tons, and with delivery about June, 1923. Several contracts have, in fact, been placed at between £8 10s. and £8 15s. per ton—prices which will mean a substantial loss to the shipbuilders. The view of shipowners who are thus contracting would seem to be that as, apparently, prices have reached bottom—at all events for the time being—it is advisable to order vessels in the hope that by the time the boats are constructed the general position will have improved.

BUILDING COSTS WILL NOT GO LOWER

The views of one shipowner of many years' experience in the placing of contracts are not devoid of interest. He states that, while, compared with pre-war prices, the present cost of building seems very large, being about thirty percent above pre-war, he does not see how values can fall to anything like those existing in 1914, owing to the cost of coal, increased railway rates, extra wages, etc. This shipowner describes the position of the Continent as "about as bad as it can be," and that any change must be for the better. Europe, he points out, still wants a mass of material of one description or another, and, once its inhabitants are in the position of getting to work on pre-war lines, trade will improve. He places against the amount of the laid-up tonnage in the world the obsolete tonnage, which, he considers, is greater than most people realize.

Then there enters into the question the highly important matter of the future of the Diesel-engined vessel. Shipowners as a body are now convinced that the ship of the future is the motorship. Probably it only requires one or two owners to be successful with the operation of internal combustion engined vessels for the rest of shipowners to lay down similar boats, but in the meantime there is—perhaps not unnaturally—a marked reluctance on the part of shipowners to act as "pioneers" in this matter. They *feel*, as I have indicated, that the future of the motorship is assured, but beyond that they are not prepared to go. It is considered that developments in Diesel ships will enable owners to

earn dividends even at current freight rates, which show a loss when accepted by the older boats, but shipowners as a body have reached the decision that before contracting, it is their duty to themselves and their shareholders to inquire closely into the working costs of such boats as compared with vessels already in their lines. Several of the leading owners, however, have given it as their intention, if the figures are satisfactory, to build one Diesel boat to test its efficiency, notwithstanding that the cost of the job may be as much as forty percent above that of a boat fitted with triple expansion engines.

RAPID GROWTH OF OIL BURNERS

The annual report of Lloyds' Register of Shipping, issued towards the close of 1922, gave striking confirmation of the revolutionary change which took place in marine bunkering methods during the year and its immediate predecessors, more than half—55 percent, to be exact—of the total tonnage of new vessels classed during the year ending June 30 being fitted for burning oil fuel. The rapidity with which the change has come about may be judged from statistics of tonnage equipped for oil burning on July 1, 1914, and last July respectively, the pre-war total being only 1,310,209 tons gross, whereas by July, 1922, this had grown to the enormous figure of 14,464,162 tons—or more than ten times the figure of eight years ago.

In closing my remarks on this particular phase of shipping and shipbuilding activity during the past year, I may, perhaps, be pardoned for placing on record the views on this subject of no less an expert than Sir Charles Greenway, Bart., the chairman of the Anglo-Persian Oil Company, Limited, who is of opinion that "the substitution of oil for coal is an important step towards the conservation of the world's supplies of the latter product, and, though burning oil beneath boilers is not the most economic, nor, therefore, the most desirable method of utilizing the energy contained in the fuel, this method has at least the argument in its favor that the fuel oil is a residual product left after the more valuable fractions have been extracted, whereas with coal a whole series of by-products as well as a considerable portion of its thermal efficiency are being wasted when used in its present state. It is gratifying, however, to see the strides that have been made within recent years towards the economic utilization of oil as a fuel by means of the introduction of the internal combustion engine, the increased adoption of which is shown by the fact that there were 1,620 motor vessels of an aggregate tonnage of 1,542,160 at July last, as against 297 vessels aggregating 234,287 tons in July, 1914."

BUILDING VESSELS ON SPECULATION

Another outstanding feature of the past year has been the attempt which has been made at various times to induce shipbuilders to construct steamers on "spec.," that is to say, the builders were to lay down the vessels on the off-chance that, when the boats were ready for delivery, the general position would have improved, thus enabling the builders, by persuading shipowners to acquire the boats, to realize for themselves a profit, however small, as a reward for their enterprise. Contrary to pre-war experience, when this method of transacting business was considered, more or less, to be

the proper one, shipbuilders nowadays show something amounting to keen disinclination to enter into such commitments. Not in every instance, it is true, for Messrs. Swan, Hunter and Wigham Richardson, whose magnitude as ship constructors may be gaged from the fact that during 1921 they launched no fewer than fourteen vessels aggregating 92,315 tons gross, and the even more imposing figure of 109,932 tons in the preceding year, have decided to take the risk of building, at their Wallsend yard, two vessels for their own account. They hope for such co-operation of the employees, by putting in good and energetic work, as will reduce the risk of loss, and encourage further similar experiments.

PRE-WAR WAGE SCHEME FAILS

Most important of all in the matter of projected "spec." contracts, however, was in the case of Messrs. Lithgows, of Port Glasgow, who, in the late summer, offered to lay down four cargo steamers on "spec.," provided the workers agreed to accept pre-war wages, plus any bonuses to which they were entitled. Messrs. Lithgows were obviously taking a considerable risk, for, even with steel down to a new level, and wages at pre-war rates, the boats would cost more to construct than shipowners might be disposed to pay for them in the open market. The matter did not proceed very far, however, for the employees, acting, apparently, under the fear that, if the offer were accepted, the position of their fellows elsewhere might be prejudiced, declined to fall in with the shipbuilders' scheme. The large financial risk which the employers were prepared to face carried no weight with the workmen or their trade unions, and the motion was lost to the hair-splitters.

Later in the year the suggestion came up again, when a Greenock municipal official suggested that, in order to relieve unemployment in the Scottish port, the local municipal corporation should accept responsibility for laying down three cargo steamers, of about 10,000 tons deadweight each, on the chance of somebody purchasing them either during construction or when completed. It was estimated that the adoption of the scheme would give employment to 1,800 men for at least six months, and would save the community about £34,000 in unemployment compensation. The suggestion fell on deaf ears until a Glasgow shipowning firm, stating that they contemplated the construction of three fruit-carrying steamers, expressed the desire to have the vessels built under the Corporation's scheme. Inasmuch as the plan failed to elicit marked approval on the part of the shipbuilders, it is felt that little or nothing will come of the project.

IDLE TONNAGE

There have been singular ups and downs in the figures of idle tonnage during the past year, but it may, perhaps with some justification, be taken as a good omen that, at the date of the last count, namely, October 1, there was an appreciable decline as compared with three months previously. The subjoined analysis of the tonnage laid up in the principal ports of the United Kingdom gives the position in a nutshell:

	No.	British Tons net.	No.	Foreign Tons net.	No.	Total Tons net.
1921						
July 25	883	1,650,788	140	201,624	1,023	1,852,412
October 25 ..	654	1,158,425	88	137,811	742	1,296,236
1922						
January 1 ...	621	1,179,548	91	128,045	712	1,307,593
April 1	422	734,240	62	102,379	484	836,619
July 1	533	1,025,662	50	86,670	583	1,112,332
October 1 ...	419	752,469	37	72,155	456	824,624

These figures, it will be noted, are all in *net* tonnage, so that about 60 percent should be added to arrive at the gross register tonnage. The table shows that on October 1 the amount of tonnage lying idle in the principal United King-

dom ports was 287,710 tons net (representing 127 vessels) lower than at July 1.

FREIGHT RATES

Closely allied to laid-up tonnage statistics are those concerning freight rates, and the fluctuations which have taken place in voyage freights and time charter freights in the last two years are interesting, 100 being taken as representing the rate in 1920. In this connection the following are vouched for by the Chamber of Shipping of the United Kingdom:

	Freights	Time charter
1921		
January	46.3	59.8
February	38.0	41.8
March	37.5	39.8
April	39.5	39.5
May	39.4	37.4
June	42.7	36.6
July	43.0	34.7
August	40.2	34.7
September	34.4	33.9
October	30.8	29.9
November	29.8	29.9
December	33.3	29.9
1922		
January	33.0	29.9
February	33.6	29.9
March	33.3	29.9
April	31.0	28.4
May	32.5	26.9
June	29.8	26.1
July	27.8	35.4
August	27.6	25.4
September	26.7	25.4
October	28.1	23.9

It will be observed that in October, the latest month for which complete data are available, freights moved up nearly two points as compared with the preceding month, but that the time charter rate had a disastrous setback at 23.9, as against 25.4 in each of the two preceding months. It would, indeed, be necessary to go back practically to pre-war days to run across a time charter as low as that current last October. Comparison of the 23.9 of October with the 59.8 of January, 1921, indicates very clearly the fall which has taken place.

REGULATIONS FOR DISCHARGING OIL

1922 saw a great step in the right direction *apropos* the discharging of oil and oily waste in docks and harbors. After a prolonged period of negotiation a scheme was at last put on foot, with the result that, as from January 1, 1923, it is unlawful under the "Oil in Navigable Waters Act" to discharge oil and oily waste from vessels in territorial waters, the aim of the measure, of course, being to put a stop to the danger to dock and shipping property arising from such discharge. These regulations were published in full in the November, 1922, issue of MARINE ENGINEERING AND SHIPPING AGE.

PORT CHARGES

While shipowners and port authorities have had a measure of unanimity on one matter, it cannot be said that their views coincide in relation to another. They are, in fact, a long way from seeing eye to eye on the question of port charges, and during the year through which we have just passed the arguments at times have been, perhaps, more pointed than polite. The various port authorities have made substantial reductions in their charges, but still not to the requirements of the shipping community, who see in port costs the biggest bill in which a cut should be made. There is certainly some justification for their contention that, while freight rates have slumped enormously, port rates in many instances remain at least double the pre-war figure.

Port authorities, however, are determined, if at all possible, to adhere to their present charges, and have applied

to the Ministry of Transport for permission to continue the existing increased charging powers. The history of these powers is of more than usual interest, in that it shows what may result from the institution of so-called "temporary" measures. Briefly, then, the powers were conferred by the Harbors, Docks and Piers (Temporary Increase of Charges) Acts, 1920-22. Shipowners and traders generally have now the right to object to the continuance of these higher charges, and, where such objections are made, the Minister of Transport must refer them to the Rates Advisory Committee, before which the objectors have a right to be heard. Thus it rests with those engaged in the shipping industry to take action, as otherwise it might be assumed that the application of the dock and harbor authorities would meet with the sanction of the Ministry of Transport.

In September, 1920, the Minister of Transport directed railway companies to increase the charges at their docks by 150 percent above the pre-war rate, the object being to prevent any further losses to the taxpayer during the period of Government control. On the de-control of the railways in August, 1921, the companies were permitted to continue the increased charges until February, 1923. In the case of the non-railway-owned docks, orders were made at various dates by the Ministry of Transport under the Act permitting them to make increased charges. These orders also were terminable in February, 1923.

In the last session of Parliament the Minister of Transport introduced a bill to continue the Harbors, Docks and Piers (Temporary Increases of Charges) Acts until February, 1925, but this Bill was amended, with the result that the Act of 1922 empowered the Ministry of Transport to continue the increased charging powers for both classes of docks only until February, 1924, with the proviso that shipowners and other parties interested should, as I have pointed out, have the right to object to such orders being made. There is ample evidence, therefore, that, unless the port authorities are induced to change their minds in the matter of charges, there will be some lively exchanges of opinion between the authorities and their shipping clients.

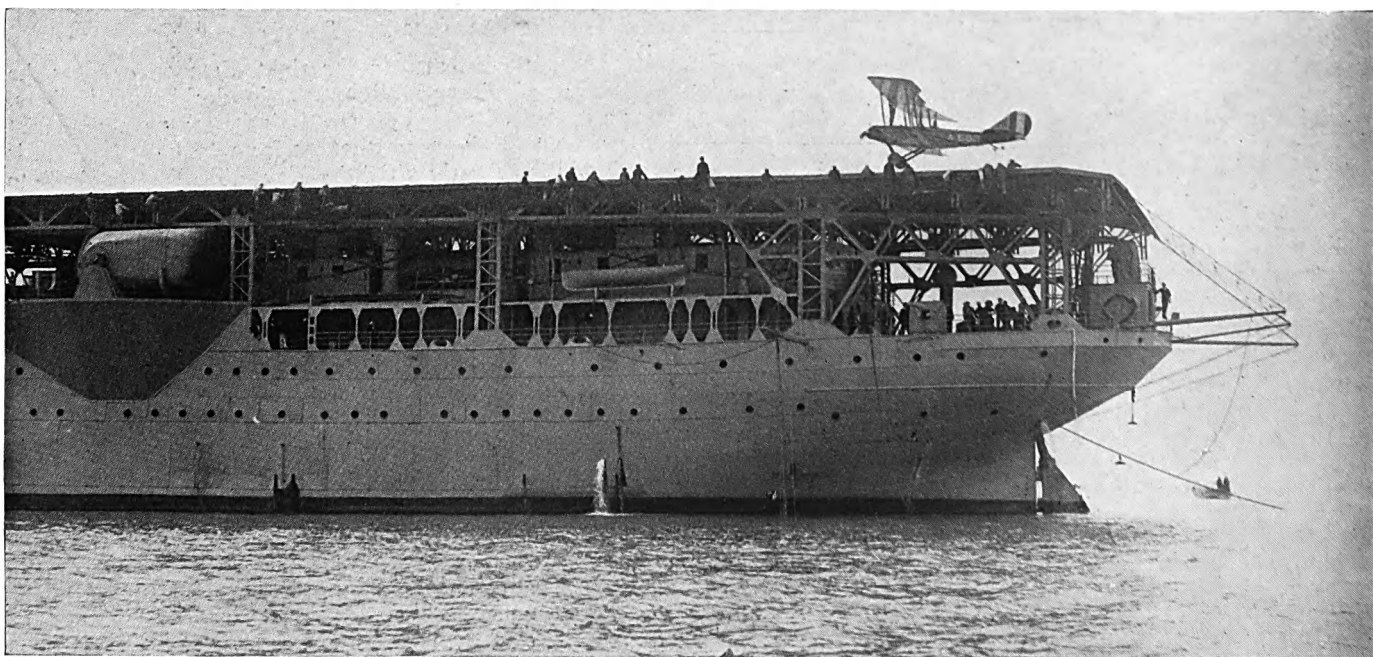
The battle for the title of "Premier Port of the United

Kingdom"—if not of the world—has been carried a stage further than could be recorded this time last year, for in the intervening period London, Liverpool and Southampton have wrestled with each other in an endeavor to secure pride of place. But the main issue, so far as mammoth dock construction is concerned, would seem to lie between Liverpool and Southampton—the former in respect of its Gladstone Dock, which is undergoing extension and improvement to enable the largest vessels in the world to find accommodation, and Southampton in regard to the huge floating dry dock, the contract for which was placed with Sir W. G. Armstrong, Whitworth and Company, Ltd., Newcastle, late in the past year.

The London and South Western Railway Company, who handle the shipping traffic at Southampton, reached their decision to build the dock in June last, and the dock is intended to accommodate the largest Transatlantic liners, including the *Majestic*, *Berengaria*, *Aquitania* and *Mauretania*. Every effort will be made to put the dock in commission before the close of 1923.

Increased capitals and reduced dividends have been the outstanding features of shipping companies' balance-sheets. Many millions sterling have been subscribed by all and sundry at the invitation of shipping companies—principally the larger liner concerns—the sums being needed, in the majority of instances, to enable the companies to pay for boats contracted for when prices were high.

In conclusion, while the shipping and shipbuilding companies of the United Kingdom experienced in 1922 a lean time, they are certainly not worse off than some of their Continental competitors, whose troubles have also been great. Exception may, perhaps, be made in the case of Germany, but so far as that country is concerned, everything in a business way is purely artificial. The "value" (save the mark) of the mark has placed German builders, owners, repairers and breakers in an advantageous position as compared with those in other countries, but, on the other hand, the domestic calls have been heavy, and it must be solely a matter for conjecture as to the *real* benefit, if any, which has accrued to German business men.



(Copyright, 1922—Pacific and Atlantic Photos, Inc.)

First Landing of Land Plane on Deck of United States Warship

In successful naval maneuvers held recently aboard the U. S. S. *Langley* in the York River, Virginia, a land-type plane for the first time landed successfully on the deck of a United States warship. Lieutenant Commander Godfrey DeC. Chevalier, flying the two-seater A-606, landed on the flight deck of the U. S. S. *Langley* while the vessel was proceeding at a speed of about six knots.

The Situation in German Shipyards

Shipowners Prevented from Placing Contracts
by Depreciation of Currency Which Makes It
Impossible to Estimate Cost of New Vessels

By K. Trautner

THE general slump in shipbuilding throughout the world has begun to make itself felt in German shipyards which until a few months ago were still sufficiently busy. The reason for this situation is to be found in the fact that the indemnities that the Federal Government had to pay to shipowners by way of compensation for merchant ships seized and delivered to the Entente have been for the most part used up and so far no further grants have been allowed due to the government being overburdened with reparation payments.

In foreign papers the opinion has been expressed of late that the Federal Government is supporting shipowners by means of high subsidies, thereby enabling them to rebuild a large merchant fleet in a comparatively short time. This, however, is not the case; it was merely a matter of indemnities, to which shipowners had an equitable right for the ships that had been taken from them. Furthermore, the sums paid were so extremely small that only a very small fraction of the 1914 tonnage could be rebuilt. Most of these replacement ships are already in operation and the balance is going to be ready within a comparatively short time.

POSSIBILITIES FOR NEW CONTRACTS

As to the securing of further shipbuilding contracts, great difficulties lie in the way of the shipyards. In particular it is thoroughly impossible in view of the daily repetition of further slumps in the value of German currency to make any safe reckoning and to submit firm offers for the building of new ships. The shipyard is therefore unable to give to the shipowner the slightest information as to the final cost of his new ship and this insecurity makes it impossible for most shipowners to place shipbuilding contracts unless they are to be paid for out of indemnities paid by the Federal Government.

Furthermore, the financial situation of practically all German shipowners has been so seriously impaired by the war that many of them were compelled to meet their most urgent requirements by refitting old ships or by making purchases abroad. It is therefore seen that the future prospects of the German shipbuilding industry are not particularly promising.

The river shipbuilding yards are still partly busy on reparation building for the Entente. This building consists mainly in river tugs and freight barges for the Rhine and the Elbe and also for the Danube.

A special type of river tow barges, many hundreds of which are to be delivered to France and to Belgium by way of reparation, consists in a type of barge having the following measurements:

Length between perpendiculars	About 124 feet 8 inches
Molded depth	About 16 feet 5 inches
Beam	About 7 feet 6 inches
Displacement	450 tons
Draft	About 7 feet 3 inches

These vessels are provided with living quarters astern and with cargo space forward. At the bow there is fitted up a small iron warping winch with 4 warping ends and amidships there is a portable mast.

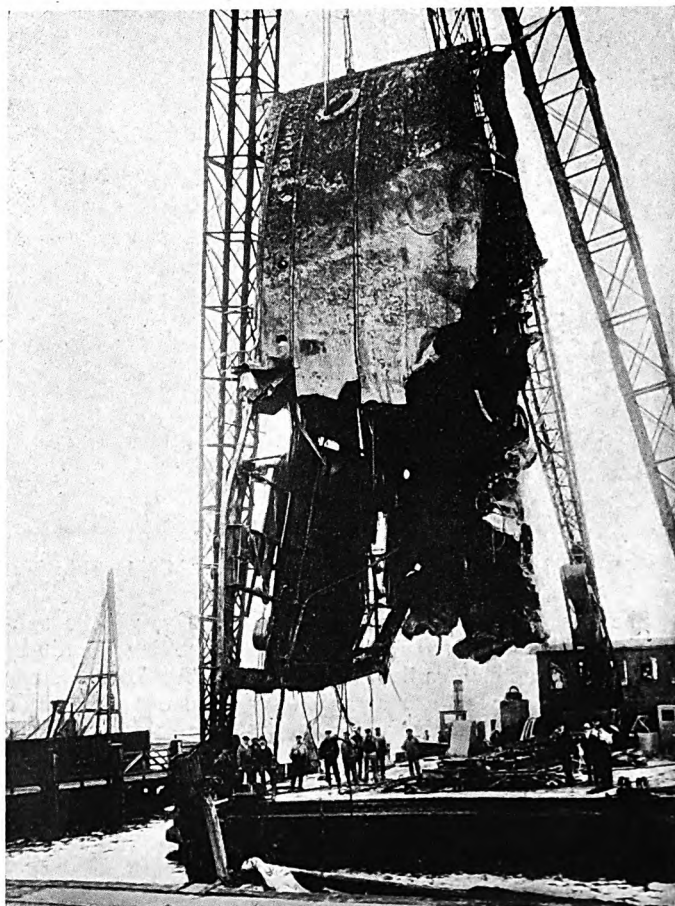
FOREIGN CONTRACTS AT HAMBURG

Among German shipyards the Deutsche Werft of Hamburg alone can boast at the present time of having succeeded in

securing some large contracts from abroad. These contracts are the following: 2 Diesel motorships of 21,000 tons dead-weight each, ordered by the Swedish shipping firm of Broerstroem of Gothenburg, and, furthermore, 2 Diesel motorships of 6,000 tons each for another Swedish company. Another Hamburg shipyard is negotiating for the building of a large freight and passenger ship which is to be built for Italy on reparation account.

SHIPBREAKING

Several other shipyards have taken up as a side line to procure work, the demolition of old or uncompleted war vessels, both domestic and foreign. Among these old war vessels particular mention should be made of the Russian armored cruiser *Askold*, of 24 knots speed and 6,100 tons displacement. This ship, distinguished by its five funnels, was one of the few vessels that was able to reach a neutral port after the battle before Port Arthur had been lost in the Russo-Japanese war.



(Photograph by Kadel & Herbert, N. Y.)

Germans Salvaging Ships Sunk Ten Years Ago for Their Iron and Metal

Due to the scarcity of iron and metal in Germany, concerns are now raising old ships that were sunk years ago to get the iron and metals. The above photograph shows the huge derrick pulling up the hull of a ship sunk ten years ago in the Kiel Canal.

FORMER NAVY YARDS CONSTRUCTING AUXILIARIES

The former Imperial shipyards of Kiel and Wilhelmshaven are engaged, aside from shipbuilding, in the construction of auxiliary engines, motors, stationary engines, etc.

While until a few months ago many foreign shipowners had their ships dry-docked in German ports, this work has likewise experienced a heavy decline, due to prices in Germany having risen so high of late that many foreign ships find it cheaper to use their domestic rather than German dry docks. Many docks, therefore, remain empty.

Considering all circumstances, German shipyards are looking forward to a dark winter. On the one hand wholesale dismissals of workmen and employees are threatened and on the other hand exorbitant increases in the prices of food, fuel and all the necessities of life, which have taken an enormous lead over salaries and wages.

New Cable Ship Marie Louise Mackay

THE *Marie Louise Mackay*, a twin screw telegraph cable repairing steamer which has been built and engined by Swan, Hunter & Wigham Richardson, Limited, at the Neptune Works, Newcastle-on-Tyne, for the Commercial Cable Company, Limited, of New York, has recently left the Tyne.

The steamer is built of steel, being about 245 feet in length by 34 feet in breadth by 24 feet 6 inches in depth.

the vessel. A large glazed shelter on the navigating bridge may be specially mentioned, where all on duty there are well protected from bad weather. The captain's accommodation is on the navigating bridge, while the rooms for the navigating and cable officers are on the awning and main decks amidships, including a very comfortable dining saloon amidships. The petty officers, cablemen and seamen are on the main deck aft.

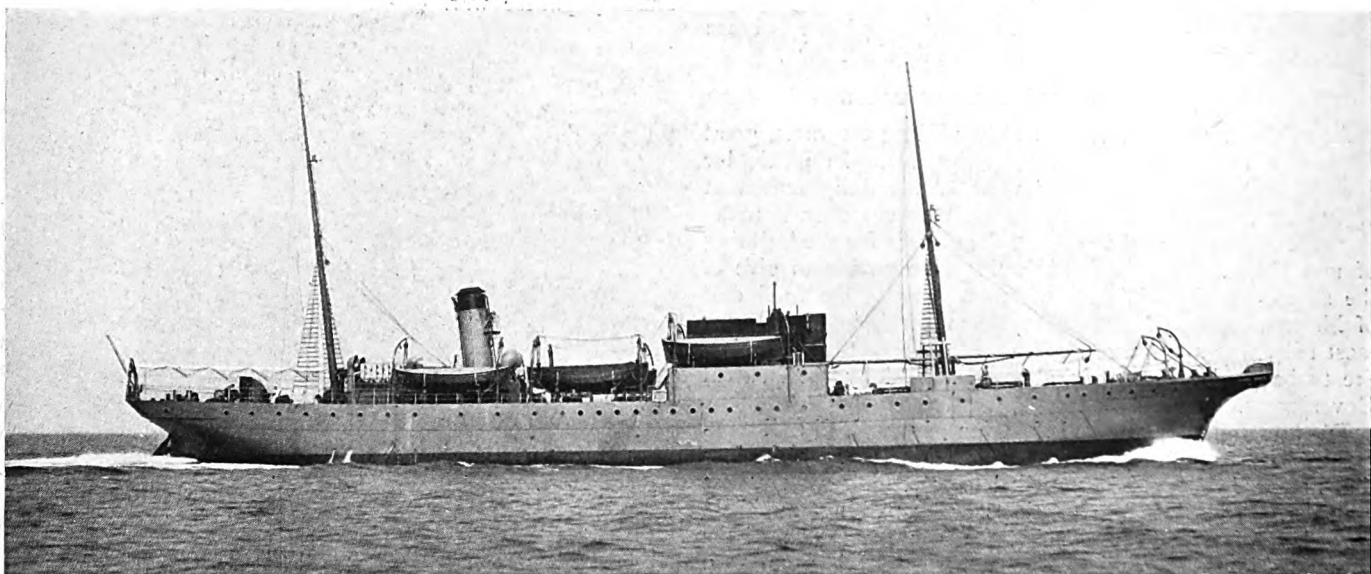
The steamer is also fitted with an installation of wireless telegraphy, ample ventilation, steam heating, electric light and bells, telephones, etc. There is a refrigerated room aft for the ship's use, as well as ample storeroom accommodation.

The auxiliary machinery for navigating and working the vessel is of the most improved pattern, including a specially designed steam windlass forward and steam capstan aft, steam winch, steamboat hoist, steam steering gear, motor-boat, etc.

PROPELLING MACHINERY

The propelling machinery, which has been constructed by Swan, Hunter & Wigham Richardson, Limited, at the Neptune Engine Works, Newcastle-on-Tyne, consists of twin screw triple expansion engines, supplied with steam from two boilers, working under Howden's system of forced draft, and fitted to burn oil fuel on the Wallsend-Howden system.

When the vessel was at sea for her trial trip, everything worked without the slightest hitch, giving entire satisfaction to all concerned, attaining a speed of 12 knots.



Cable Ship Marie Louise Mackay

She has three cable tanks for the carriage of the submarine cable, all placed forward of the propelling machinery and having a total coiling capacity of about 18,000 cubic feet and a hold forward arranged for the stowage of cable stores, etc. The machinery for working the cables has been supplied by the Telegraph Construction and Maintenance Company, Limited, and is of their latest design; it includes picking up and paying out gears, Lucas dynamometers and a Lucas patent sounding machine. Three large cable sheaves are fitted to the overhanging bow.

Arrangements have been made for the carriage of water ballast in both the fore and after peaks and in the double bottom, while the oil fuel is carried in a cross bunker and is of sufficient capacity for a cruise of 6,000 miles.

CREW ACCOMMODATIONS

The comfort of the staff on board has been the object of special consideration in designing the accommodations of

The vessel, which has been built under the supervision of Capt. F. H. Larnder, O.B.E., is the second cable steamer recently built at the Neptune Works for the Commercial Cable Company. The other, a much larger steamer, called the *John W. Mackay*, has made a very successful beginning to her career since her delivery to her owners early in June last year.

New Port Association Proposed

Frank S. Davis, manager of the Maritime Association, Boston Chamber of Commerce, has invited port organizations at the several North Atlantic ports to convene for the purpose of organizing a North Atlantic Ports Association. The meeting will probably be held in New York City in the near future, when the aims of the association will be disclosed and officers elected.

Efficiency in the Operation of Steamships*

Analysis of Operating Costs Shows Where Economies Can Be Effected—Why American Ships Need A Subsidy

By Captain Daniel A. J. Sullivan†

SINCE the inception of transporting freight by means of water routes until the present time, there has been one important question which has caused more worry and deep study than any other, and that is the cost of operation. In the study of this subject one is impressed with the importance of every detail which added together makes the whole, so that in delving into the records of the past, those of us who are now striving to produce efficiency realize the necessity that each and every member of the profession should understand that his efforts and his labor are a part of the whole, and if the results of his labor are not up to the mark, then the whole will be handicapped by just that amount. So in the efficient operation of any ship, every person who has had a part in designing, in building and then in operating that ship is responsible for his part, and if each and every one has produced perfect results then the result as a whole should be perfect.

In theory this is true, but in practice we find too many "exceptional conditions," which expression has been used to cover a multitude of blunders in the past as well as in the present. So in the study of this subject we must admit to ourselves that each of us is responsible for the results attained, and that on the blunders of the past we can erect a perfect organization for successful operation.

The history of shipping reveals many interesting events, and without spending too much time on the past, it is well to recall that supremacy of the seas has gradually changed from nation to nation since the beginning of water transportation until the present, and will continue to be fought out on economic lines until the end of time. In studying the cause of the gain or loss of the supremacy of the seas, it appears to be true that the nation which can build ships for less than others, and whose vessels can transport cargoes faster and cheaper than others, will rule the sea. Here again enters the "exceptional condition" in the form of Government ownership and of Government subsidy.

At the time of writing this article, an effort is being made to place the merchant marine of the United States on an equal competitive basis with the merchant marine of other nations by the adoption of a ship subsidy. Those interested in the success of vessels under the American flag realize the necessity of this measure.

WHY A SHIP SUBSIDY IS NECESSARY

First, on account of the higher first cost of the vessels built in the United States.

Second, the American merchant marine is the only important American industry not protected by tariff.

Third, to equalize the present unfair competition on account of the subsidy paid to the merchant marine by other nations in competition with the merchant marine of the United States.

Fourth, on account of protection to other industries the standard of living of its employees is raised to a much higher level than the standard of living in any other country, and it is unfair to the seafaring profession to force them to a standard of living which would not be tolerated ashore.

*Paper read before the Society of Naval Architects and Marine Engineers, New York, November 9, 1922.

†Commodore of the Black Diamond Steamship Corporation, New York.

Many critics of American shipping insist that Americans cannot operate ships. These gentlemen forget the records of the past, the most interesting of which is the era of the clipper ship, which commenced prior to the War of the Revolution and continued until just after the Civil War, when the era of steam vessels began. The years between 1843 to 1869 are to all Americans who love the sea the most interesting, as during this time American shipbuilders constructed the finest models of sailing ships ever launched. With these ships the American shipmaster proved himself superior to any shipmaster in the world, and it is a matter of record how American clippers were loading in China ports at higher freight rates while vessels of other nations could not get cargoes in the same port at lower freight rates, owing to the difference of speed, and here it may be well to quote from "The Clipper Ship Era," by Captain Arthur H. Clark, published in 1910.

"Of the men who commanded the American clipper ships, it may be said that they carried the ensign of the United States to every quarter of the globe, with honor to their country and themselves. Each had his strongly marked individual traits of character and his human weaknesses. Nothing could be more remote from the truth than to imagine these men as blustering bullies at sea or rollicking shellbacks on shore; neither were they Chesterfields or Carpet Knights, afloat or ashore, nor at all the type of skipper that one is apt to meet in works of fiction. Many of them might easily have been mistaken for prosperous merchants or professional men, until a more intimate acquaintance disclosed the aura of salted winds and surging seas, and a world-wide knowledge of men and cities. It may well be doubted whether braver, truer-hearted gentlemen or finer seamen than many of the American clipper ship captains of half a century ago have ever sailed the seas."

When these men won the supremacy of merchant shipping for American vessels it was said of them in 1860 by a critic of the merchant marine of another nation: "We have no masters who can match the masters of American vessels, and until we do, and allow them full control of our vessels, we cannot compete successfully."

Even in those early days it was thoroughly understood that the success or failure of the venture was solely in the hands of the master.

Succeeding the era of clipper ships came the era of steam, and as other nations built and operated steamships the American ensign gradually faded from the sea, and the year 1913 saw American shipping at its lowest mark.

OCEAN SHIPPING DURING AND AFTER THE WORLD WAR

The World War commenced in 1914 and naturally the demand for tonnage grew, and as the demand increased the rates soared. Since everything connected with the shipping interests follows closely the law of supply and demand, the operating cost during the war period attained such heights as to be unbelievable. During this period of inflated prices, as a defensive measure, America had constructed a large number of vessels, and when peace was declared America found herself in possession of one of the greatest merchant fleets the world had ever dreamed of. It then became a problem how to make the best use of this fleet.

It is useless to attempt to conceal the fact that at this time there existed many steamship companies, whose organizers and officials knew little about the shipping business and less

about the traditions and established customs of the sea. Wages soared, conditions afloat and ashore became impossible, operating costs were excessive, claims for cargo damage and loss were unreasonably high, and with the perfection of systems of communication the status of the master and officers was reduced to practically that of a high priced office boy—obeying orders issued from ashore by those who were intoxicated by high freight rates and large profits, who thought more of the American dollar than they did of the safety of the vessel or its mark. However, as freight rates decreased, it was realized that steamship companies founded on inexperience could not endure, and it is to the credit of the profession to say that ability, experience, and efficiency are being recognized and will eventually regain control.

During the past two years, rates have fallen to the level of, and in some instances to a point lower than pre-war rates, and in the struggle of American vessels for existence in the shipping world against the bitter competition of foreign vessels which enjoy a lower operating cost, as well as a government subsidy, American shipping has reached that stage where the cost of efficient operation means success or failure to our merchant marine as a whole.

It is a fact that, among the various grades of ship officers, the American merchant marine can boast of having many who are efficient, but unfortunately many masters lack sufficient business training, due to the modern method in steamship offices where the master is not allowed to handle details with which he should be familiar, and naturally in this connection the shipowner is standing in his own light.

COMPARATIVE COSTS OF OPERATION IN THE TRANSATLANTIC TRADE

To establish a basis of comparison of the cost of operation for all classes of ships is an impossibility, and after considering the mass of data available it was decided that each vessel was an individual study.

Herewith are presented data of three vessels in transatlantic trade, reduced to an average of one voyage and all expenses are included; total cost represented as 100 percent:

	Example A Percent	Example B Percent	Example C Percent
Fuel	23.6	29.9	27.9
Stevedoring, tally, watching, clerks...	20.6	16.0	22.9
Wages on ship	11.2	14.4	13.0
Insurance	10.4	8.1	12.0
Wharfage	7.7	1.9	2.2
Agency and brokerage	4.9	3.4	2.7
Grain fittings	3.1	2.9	...
Food for crew	3.0	3.0	1.4
Stores deck department	2.0	2.9	2.9
Stores engine department	2.5	3.4	3.6
Stores steward department	0.2	0.3	0.25
Advertising	2.4	0.4	0.3
Towboats	1.8	1.5	1.4
Pilotage	1.3	1.3	1.4
Port charges	1.4	1.8	1.6
Repairs	1.6	5.1	3.6
Miscellaneous	2.1	3.5	2.6
Laundry	0.2	0.2	0.25
Total	100	100	100

From a study of the above data one readily sees that fuel, cost of handling cargo, wages and insurance are the most important items of expense.

FUEL EXPENSE

Fuel is the most important item of expense in operation and is a subject to which little intelligent study has been given, and while general results have been compared, very little satisfactory data are obtainable. The United States Shipping Board has just appointed a committee to study this

subject; this committee is afforded a great opportunity to render service to the profession.

The prevailing practice today is to buy fuel on a price basis, and no consideration is given to the heat units contained therein nor to the subsequent results obtained.

In vessels using oil fuel, where this fuel is carried in double bottoms, sufficient attention has not been given to the arrangements for heating the fuel in the tanks, with the result that in cold weather considerable loss occurs. However, many interested in efficiency feel that the Shipping Board Fuel Committee will submit data and promulgate a set of rules of procedure which, if followed, will greatly improve results.

CARGO HANDLING COSTS

Next in importance to fuel is the cost of handling cargo, which includes loading, checking, sorting, watching, and clerk hire on dock. Investigation revealed that the total actual cost per ton of general cargo handled in New York varied from \$1.15 a ton to \$1.65, and in the ports on the Atlantic coast the range in cost per ton was from \$0.92 to \$2.15. One interesting example is as follows:

Cargo handled 152.4 tons general.	
Stevedoring	\$137.00
Cooperage	75.00
Watching	70.00
Sorting and delivering	284.00
Total cost	\$566.00
Average cost, \$3.71 per ton.	

One only need check up on a ship during the loading and discharging to realize where the money goes. This item alone, on an average, is one-fifth to one-sixth of the total expense and is seldom checked as to delays, waiting, overtime, etc. With proper supervision, even with the high rates of pay, this excessive rate per ton could be greatly reduced.

WAGES

Third in importance in operating cost of a vessel are wages afloat. So very much unreliable data have been printed about this subject that great care was exercised to obtain only authentic data, and the rates of pay quoted on American vessels was taken from shipping articles which are on file in the commissioner's office. The rates of pay on foreign vessels were obtained from vessels in service and shipowners, and for the benefit of those who are interested the information is tabulated and herewith presented in the hope that it will speak for itself.

The standard of living in this country is so different from that in foreign countries that it is absolutely unfair to compare American wages with those of foreign vessels.

One of the most unfortunate lines of reasoning today is that by cutting wages one obtains efficiency. It matters not in what capacity a man is employed, if the wages for that rating are higher than the wages for the same ratings in other lines, then the most efficient man will be found for the place.

Perhaps the reader may find in the scale of wages herewith presented sufficient explanation as to why the native born American does not adopt the profession of the sea.

INSURANCE

Much could be written about the subject of insurance—all classes—but it would not influence the prevailing opinion of those who should know the subject fairly well. Any discussion on this subject can be summed up by saying that when loss and damage are high the rate is high and when loss and damage are low the rate is low. This cost could be reduced by bonus to ships' officers and self-insurance.

The remaining items which enter into the cost of operation are either unavoidable or under the supervision of the personnel afloat, and if care has been exercised to select only

WAGE SCALE EFFECTED ON JULY 1, 1922

	U.S.S.B. Scale	A.S.O.A. Scale	Private Owned American Actually Paid		British £	\$4.40	German Marks 400 to \$1		Danish 1 Krone 2 1/2 c		Swedish 1 Krona 25 1/2 c	
Master	\$270.00	\$275.00	.....	.....	£45	\$198.00	6,000	\$15.00	.....	.....	.....	.....
1st mate	165.00	165.00	\$150.00	\$150.00	21-10	94.60	4,200	10.50	750	\$161.25	600	\$153.00
2nd mate	145.00	140.00	125.00	115.00	16	70.40	3,800	9.50	625	134.38	420	107.10
3rd mate	130.00	125.00	100.00	95.00	13	57.20	3,425	8.55	450	96.75	380	96.90
Wireless	90.00	90.00	90.00	80.00	13-10	59.40	.....	.....	.....	.....	.....	.....
Carpenter	70.00	70.00	45.00	40.00	12-10	55.00	2,750	6.90	345	74.18	300	76.50
Boatswain	65.00	.....	45.00	40.00	11-10	50.60	2,750	6.90	345	74.18	300	76.50
A. B. Seaman....	55.00	47.50	35.00	35.00	10	44.00	2,600	6.50	316	67.94	275	70.13
Ordinary seaman..	40.00	35.00	25.00	30.00	5-10	24.20	1,200	3.00	200	43.00	180	45.90
Chief engineer ..	240.00	250.00	240.00	225.00	24-10	107.80	5,500	13.75	1,100	236.50	430	109.65
1st asst. engineer..	165.00	165.00	150.00	150.00	20-10	90.20	4,200	10.50	850	182.75	400	102.00
2nd asst. engineer..	145.00	140.00	125.00	115.00	16	70.40	3,800	9.50	650	139.75	350	89.25
3rd asst. engineer..	130.00	125.00	100.00	95.00	13	57.20	3,425	8.55	575	123.63	285	72.68
Deck engineer ..	70.00	70.00	45.00	.....	11-10	50.60	.....	.....	.....	.....	.....	.....
Oiler	65.00	55.00	40.00	42.50	11	48.40	2,750	6.90	450	96.75	290	73.95
Fireman (oil) ..	57.50	50.00	35.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fireman (coal) ..	.....	50.00	.....	40.00	10-10	46.20	2,650	6.62	322	69.23	275	70.13
Wiper	50.00	35.00	25.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coalpasser .....	.....	40.00	.....	35.00	10	44.00	2,400	6.00	215	46.23	.....	.....
Steward	105.00	105.00	100.00	90.00	14-10	63.80	2,600	6.50	530	113.95	350	89.25
Cook	90.00	90.00	80.00	75.00	13-10	59.40	2,850	7.12	450	96.75	325	82.88
Baker	70.00	70.00	45.00	60.00	9-10	41.80	2,440	6.10	230	49.45	.....	.....
Messman	35.00	35.00	35.00	40.00	8-10	37.40	2,440	6.10	90	19.35	80	20.40
Messboy	35.00	35.00	35.00	35.00	.....	.....	1,525	3.81	.....	.....	.....	.....

efficient officers, it naturally follows that they will produce efficient results.

SUBSISTENCE

The question of subsistence, while not very large in total cost, is most important in having satisfied personnel afloat, and sufficient care should be exercised to see that food is properly prepared and made appetizing instead of the all too common practice of serving improperly prepared and unpalatable food.

The Shipping Board has recently placed a limit on the cost of feeding of 65 cents per man per day. My experience is that this is a generous allowance, provided that it is judiciously expended.

DECK AND ENGINE STORES

In the matter of deck and engine stores it would be well to work out an annual schedule of allowances and requirements. In discussing this subject with one of the profession, I found that he had worked up data for a company covering its fleet of quite a number of vessels, and on an average the figures of cost allowance check very close for requirements. For example, a vessel of the 7,500 to 9,000 deadweight ton class was allowed:

Deck department	\$17.30 per day
Engine department	19.15 per day
Steward sundries	5.25 per day

In comparing these figures with those of actual operation, they were found to be rather generous, and it only confirms the opinion that in these departments, with a fixed schedule, the former excessive cost can be reduced to a minimum.

Taken as a whole, one is impressed with the manner in which shipping is handled since the days of the World War, and while in many cases there is too much misdirected energy, the members of the profession realize that the time has arrived to establish the American merchant marine on a clean, efficient business basis, and to regulate the operating cost so that it will be on a par with international competition.

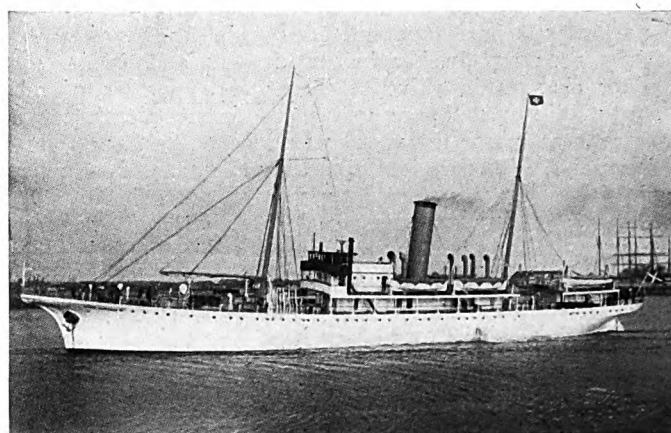
PERSONNEL

From a study of the data available, the writer is of the opinion that American ships can be made efficient, and excepting the excessive first cost, depreciation and overhead

expense, can hold their own against any competition. To accomplish this result there should be closer relations between the executives of companies and the masters of their vessels. Masters should be selected for their efficiency and given absolute authority over the operation of their vessels. Chief engineers should be selected likewise and given absolute authority over their own department. The master should be furnished with complete cost data so that he can remedy high cost over which he has control and show the owner the excessive cost over which he has no control, so that this handicap may be overcome.

EXPERIENCED MEN NEEDED

Managers and marine superintendents should be men who have served as master of a vessel. Superintending engineers should be men who have served as chief engineer of a vessel. Everything concerning the handling and stowage of cargo should be subject to the approval of the master of the vessel. If the master is to be held responsible, he should be given full authority regarding all details involved in the operation of his vessel.



Store Nordiske, New Oil-Fired Cable Ship

Built by Nakskov Shipyard, Limited, Nakskov, Denmark, for the Shanghai station of the Great Northern Telegraph Company. Principal dimensions of the vessel are as follows: Length, 238 feet 6 inches; beam, 35 feet; depth, 23 feet 6 inches.

Fuel Economy in Shipping Board Vessels*

Methods Prescribed for Purchasing Fuel—Instructions Given for Taking It on Board and Standards Set for Burning It

By Commander R. D. Gatewood†

AN analysis of the total operating expenses or outgo indicates that fuel alone amounts to from 22 to 25 percent of the total cost of running a ship. It is more than the wages of the men, the food they eat, the repairs to the vessel and the consumable stores all combined!

Realizing this, Mr. Joseph Sheedy, who is the first engineer to be made a vice-president of the Emergency Fleet Corporation, appointed a committee known as the Fuel Conservation Committee, whose chairman is Captain C. A. McAllister. A better selection it would be hard to find. An American engineer of high attainments, he was for many years engineering head of one of the most efficient departments of the Government, and one in which the appropriations have always been pared to the bone—namely, the United States Coast Guard. His experience in keeping within the extremely limited appropriations and his natural tendency toward thrift and economy, that comes to him from his Scotch ancestry, fit him eminently well for the position.

The committee conceives its problem to be to get the most out of the ships as they now are, without the expenditure of any very considerable sums to rebuild them. The Government is mandated by Congress to sell them, and except for certain major defects which must be corrected in a given ship here and there, the Government will not receive any more money for the ship after the expenditure involved in changing a lot of the machinery of the vessels; and the committee feels that the principal problem is to bring the present equipment up to its maximum performance.

To this end, the operating fleet of 400 vessels was analyzed with regard to the kind of fuel burned, and this analysis showed that 90 percent of the vessels burned oil and only 10 percent burned coal; whereupon it was immediately decided to concentrate the major effort of the committee on oil-burning vessels.

RESULTS OBTAINED ON THE S. S. AMERICA

In order to show, however, just what could be done with coal-burning vessels, the largest coal-burner in the fleet, except one,—namely, the *America*,—was chosen as the vessel to be given special attention and study. A careful analysis of her boiler and engine department was made, and it was at once apparent that certain changes were absolutely necessary in her boiler furnaces and fronts, some minor changes in valve settings and a number of other minor adjustments here and there throughout the engine department before the vessel would be ready to perform in accordance with the standard set for that type of machinery. All this work was done at a cost of not over \$7,000 or \$8,000, and then several special expert observers were sent on her to Europe and return, every possible care being taken to fire the boilers in the most economical way and operate the department in accordance with the best known engineering practice, considering the age of the vessel.

The results were truly surprising to the lay mind, but were no greater than the committee anticipated. Here was a vessel that had been sailing back and forth across the ocean for many months, making her schedule but with apparently relatively little regard for the fine points of fuel

consumption. On the very first trip the vessel saved 400 tons of coal on the round trip. She has just returned from a second trip and made a similar saving, maintaining on both trips equal or slightly better speed than for the past four or five round voyages. The total saving on the two trips more than outweighs the expenditure involved in correcting the defects that the committee found, and the vessel will continue to operate back and forth across the ocean, saving about 500 tons a trip over previous voyages. This will serve to give some indication of the practical nature of the work of the committee and the benefits to be derived therefrom.

PERFORMANCE STANDARDS TO BE SET

The committee has further subdivided its problem into one of sea consumption and port consumption; these two problems involve study along quite different lines. Some steamship lines operate well at sea and poorly in port; others operate economically in port but are very expensive at sea. The committee is now engaged in setting a set of standards for each and every type of vessel now operating, showing to the operators and the chief engineers exactly what their performance ought to be in the amount of coal burned per mile. Heretofore there has been absolutely nothing for the engineers to work toward as a standard. Already these standards have been developed for several types, and in practically every case the vessels are found to fall well below the reasonable standard set by the committee, and already there has been a marked improvement in these types to bring up the performance of the vessels and meet the standard or better it.

The port consumption problem will be attacked in the same way, but necessarily owing to the great number of vessels and the difference in their motive power, any such problem becomes a very large one and cannot be proceeded with too rapidly. The saving in fuel that may be possible is, however, a great incentive to the committee, for the reason that our fuel bill for last year was between \$35,000,000 and \$40,000,000, and if, as is confidently believed, we can save 10 percent of this amount, a truly creditable piece of work will have been accomplished.

EXPERT FUEL INSPECTORS APPOINTED

The committee began its work by an analysis of the specifications for the fuel and an examination into how it was purchased and inspected, and it was at once apparent that while the specifications were apparently adequate and sound and conformed to the specifications in the general business and governmental world, there was not an adequate staff to insure that the material actually purchased was in every case in accordance with the specifications. As a result of the work of the committee, expert fuel inspectors have been appointed at several of our principal ports to insure the best quality of fuel being obtained and placed on our vessels.

The next step of the committee was to standardize instructions for engineers for taking the fuel on board. Many lines had no specific instructions at all, and in no one place was the committee able to find a standard set of practical instructions covering the points to be observed by the personnel of the engineering staff of the vessel in taking on oil or coal. Standard instructions are being printed and will be furnished to every vessel in glass-covered bulletin

*Prepared for the Marine Exposition, New York, November 11, 1922.
†Director of the Department of Maintenance and Repair, United States Shipping Board Emergency Fleet Corporation.

boards installed on the bulkheads in the mess-room of the engineers, so that there can be no question in future as to what the personnel of the ship should do to insure the highest quality and full quantity of fuel.

FUEL OIL BURNING SCHOOL ESTABLISHED

From the very outset of the committee's investigation it was apparent that as, in most of the other troubles of the merchant marine, the personnel of the ship constitutes at least 25 percent of the trouble. The men simply do not know the essential principles of economical burning of fuel. They have been operating so long under rule of thumb methods that the practice on board ship in our merchant marine is deplorable as compared with modern high-class power station practice. It was soon apparent that we would have to provide expert instruction for the engineers who were to be in charge of burning fuel, and this could best be done at the Naval Experimental Fuel Oil Burning Plant at Philadelphia. Our Navy has taken the leading part in the burning of oil fuel, and it is recognized everywhere abroad as having the greatest experience and the largest amount of expert technical data in connection with this problem, of any Navy or, indeed, of any engineering body of men. Thanks to the hearty co-operation of the Secretary of the Navy and Admiral J. K. Robison, arrangements have been made with the Navy to turn over this splendid experimental plant as a school of instruction for engineers of the merchant marine, and two classes have already been graduated from the school.

A more enthusiastic lot of men it will be hard to imagine than these classes are, both before and after going to school, and already the cry has gone up to provide for an additional so-called post-graduate course for many of these men, who see the great possibilities of saving that are possible under the expert teaching at the school. The classes are limited to from twelve to eighteen men and the instruction requires five full days of eight hours each, in which are combined lectures and practical work with boilers, burners and various instruments for determining the efficiency of combustion.

The managing operators have given the most hearty co-operation to this school, and the number of applicants is already greatly in excess of the ability to provide for so many eager engineers. The graduates of the school are already beginning to spread something of the doctrine obtained there and the practical ideas so new and interesting to them, and it is not too much to say that within the next year our merchant marine should have the best qualified set of fuel burning engineers of any in the world.

PRINTED INSTRUCTIONS ON PRACTICAL POINTS OF OPERATION

The committee has arranged to provide all chiefs and first assistants on our vessels with a set of pamphlet instructions containing the practical points of operation of all the various machinery in the engine department, including pumps, dynamos, ice-machines, etc. These are to be taken from a set of standard instructions that have been used with the greatest success in the Navy, and even before these are ready for printing and distribution the demand for them is so great that instead of printing by the hundreds we will have to have them printed by the thousands.

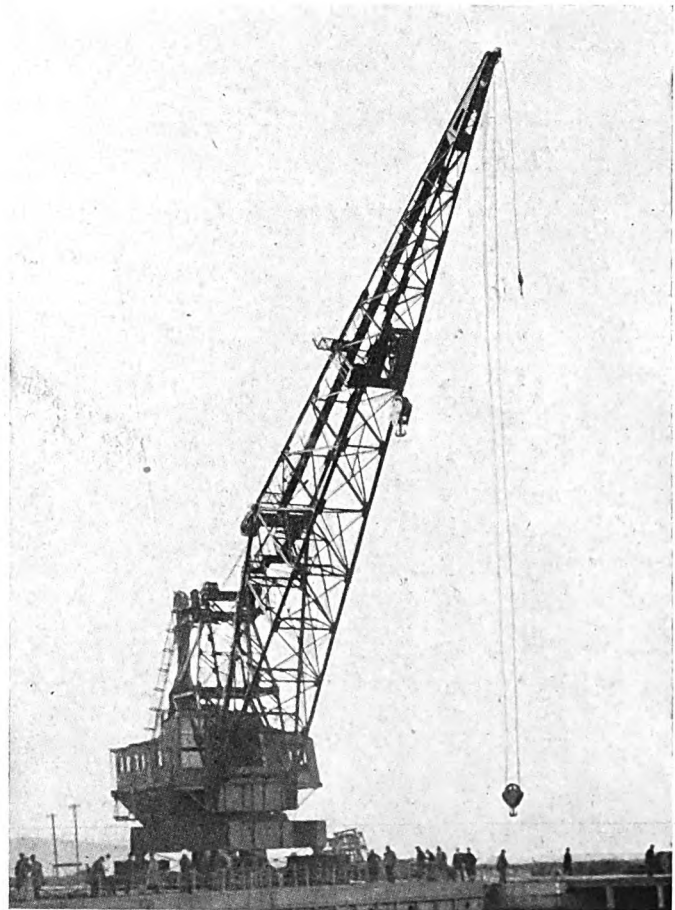
Indeed, the whole subject of conservation of fuel, and the millions of dollars that can be saved by intelligently burning it, has taken on new life and is being talked of more in engineering circles aboard ship than almost any other single thing.

The final work of the committee, after having prescribed how the fuel should be bought, how taken on board, and the standard to be met in burning the fuel, will be to take each and every vessel that cannot maintain the standard

set and place an expert engineer on board for a cruise to analyze carefully every phase of the operating and engine department with a view of bringing the vessel up to the standard set for it, and there is no doubt in the minds of the committee that within the next year or so there will be practically no vessel operating for the Shipping Board that is not maintaining a standard of fuel consumption equal to or better than that obtained either by our operators or by the vessels of our own country in private operation in either domestic or foreign trade.

MARKED INCREASE IN EFFICIENCY

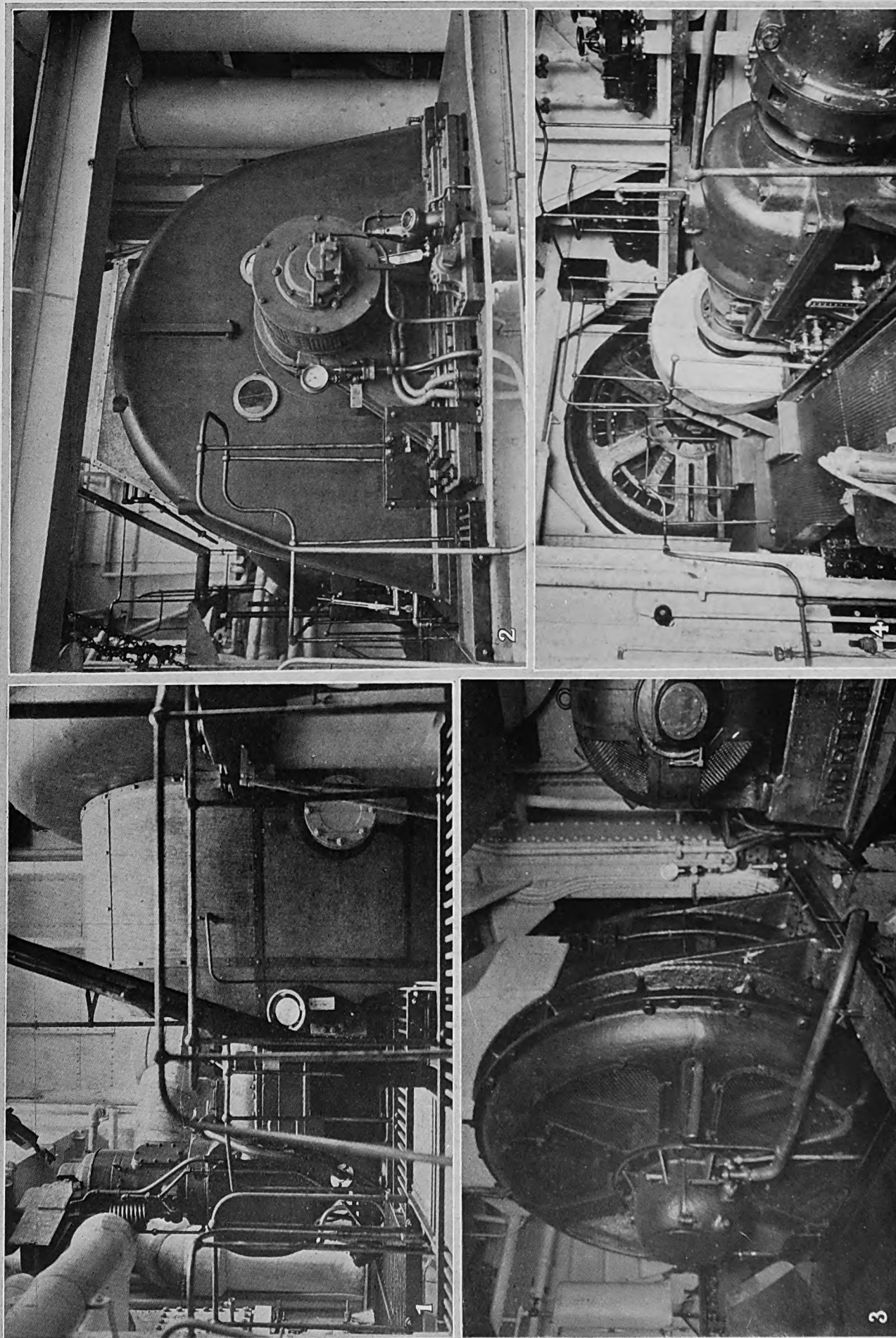
The mere fact that an experienced committee of engineers is going to go over the records of the performance of the vessel has already resulted in a marked increase in the efficiency of the performance of many vessels. The good men are anxious to make their performance so good that their present performance will be quite equal to any standard that might be required of them; the inefficient men are afraid of losing jobs unless they can show a performance that measures up well to the standard, and the psychological effect alone of such a committee has already been found to be of the greatest possible help in bringing up the efficiency of the engine department, even though the committee did nothing along the more practical lines outlined above.



(Photograph by Kadel & Herbert, N. Y.)

Largest Crane in the World at the Boston Army Base

The largest crane in the world, at the army base, South Boston, recently put in service, has a maximum capacity of 50 tons at radius of 90 feet. There are two auxiliary hoists with capacities of 15 and 5 tons at a radius of 130 and 133 feet, respectively. The crane without load weighs approximately 580 tons. This weight is distributed over 32 wheels, through a system of trucks which equalizes loads on the wheels. These wheels run on a 22-foot gage track. The trucks are so articulated that the crane will traverse the curve at the head of the dock, having a center line radius of 89 feet.



Figs. 1-4.—Propelling Machinery of H. I. J. M. S. Kamoi: (1) Steam End of Main Turbine Generator, Showing (at Left) Long Range Mechanical Governor; (2) Alternator End of Main Turbine Generator; (3) Starboard Propelling Motor, Looking Aft, at the Right Is the End of the Main Circulating Pump Motor; (4) Starboard Propelling Motor, Looking Forward, Showing Turning Gear and Thrust Bearing

Electric Propelling Machinery of H. I. J. M. S. Kamoi

Propulsion Is by Synchronous Motors—Three-Bearing Construction Reduces Length and Weight of Turbine Generator

By W. L. Wright*

THE success of electric drive for merchant ships has again made itself manifest in the performance of the H. I. J. M. S. *Kamoi*, which has recently departed from this country on its maiden and home voyage to Japan. The *Kamoi*, which was built by the New York Shipbuilding Corporation at Camden, N. J., for the Imperial Japanese Navy, was launched on June 8, 1922, the official acceptance trials completed September 5 and 6, and she departed for Japan with cargo on October 5. Although to be operated by the Japanese Navy, she was built in accordance with Lloyd's requirements and carries a merchant ship classification.

This vessel is primarily a fuel oil tanker, length 496 feet, beam 67 feet, mean draft, loaded, 28 feet 9 inches, has a capacity for approximately 10,000 tons of fuel oil, and, in addition, has a bunker capacity for approximately 4,000 tons of coal. She is twin screw and designed for 15 knots speed at 8,000 shaft horsepower.

MAIN PROPELLING MACHINERY

The main propelling machinery, which is of the turbine electric type, was built by the General Electric Company and consists of the following:

1—General Electric Curtis turbine, 10-stage, 8,000 horsepower, 2,400 revolutions per minute, designed for normal steam condition of 250 pounds gage, 150 degrees F. superheat, and 1.5 inches absolute back pressure.

1—Main alternating current generator direct connected to above turbine, and rated 2-pole, 6,250 kilowatts, 2,300 volts, 3-phase.

2—Main propelling motors of the synchronous type, arranged for induction starting, each rated 40-pole, 3,125 kilowatts, 4,000 horsepower, 120 revolutions per minute, 2,300 volts, 3-phase, each direct connected to a propeller shaft.

2—400 kilowatt direct current turbine geared generators, arranged for condensing operation, each 5,000/1,100 revolutions per minute, 400 kilowatts, 6-pole, 225/112.5 volt, 3-wire. For supplying ship's light and power and excitation for main generator and motors.

1—Auxiliary alternating current generator, rated 2-pole, 625 kilowatts, 1,100 revolutions per minute, for emergency propulsion, arranged to be connected through a flexible coupling to the ar-

* Marine Engineering Department, General Electric Company, Schenectady, N. Y.

mature shaft of one of the auxiliary generating sets, the turbine and gear of which have an overload capacity for delivering 625 kilowatts continuous at the alternating current generator terminals.

1—Main control panel with high and low voltage control group for controlling the main generator and motors.

1—Direct current switchboard for controlling the 400 kilowatt auxiliary generating sets.

ARRANGEMENT OF PROPELLING MACHINERY

The arrangement of the propelling machinery is shown in Figs. 7, 8 and 9. It will be noted that the main turbine generator is located on a 28-foot flat, together with the two auxiliary generators, direct current switchboard, and main control panel; while the main motors and engine room auxiliaries are located in the space below. The arrangement of machinery in this vessel demonstrates the flexibility with which the electric system of propulsion may be installed as compared with other types of drives in which the prime movers are mechanically connected to the propeller shafts. The main generator, as located, is near the neutral axis of the ship and is thereby least affected by the rolling of the vessel in heavy seas. The foundation for the main turbine generator also serves as a support for the main condenser, which is connected to the turbine exhaust flange by means of a diaphragm type expansion joint. Two motor-driven condensate pumps of 120,000 pounds per hour capacity are located on the engine room floor directly beneath the main condenser. The main circulating pump of 15,000 gallons per minute capacity, which is also motor-driven, is located immediately forward and below the main condenser. The main condenser is equipped with two Le Blanc air ejectors.

AUXILIARY GENERATING PLANT

The port side of the 28-foot flat is devoted to the auxiliary generating plant consisting of two 400 kilowatt direct current turbine geared generators and the direct current switchboard. The auxiliary turbines are arranged to exhaust normally into the main condenser. However, an auxiliary condenser is provided for port use. Provision is also made for operating these sets non-condensing by opening a valve

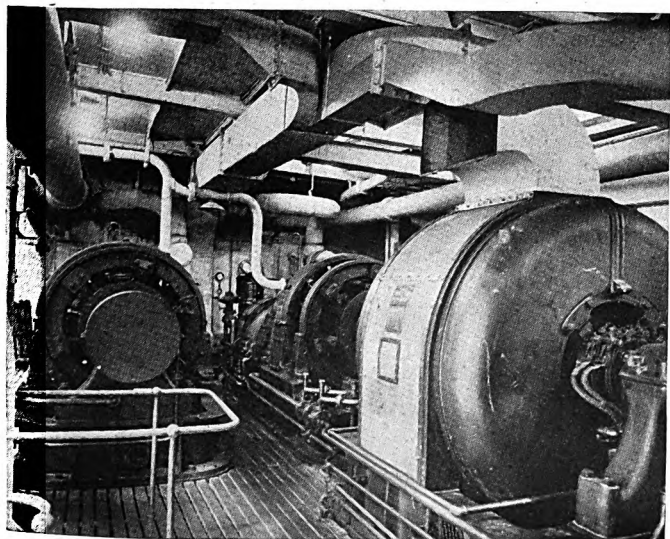


Fig. 5.—Auxiliary Turbine Generator Supplying Ship's Lighting and Auxiliary Power

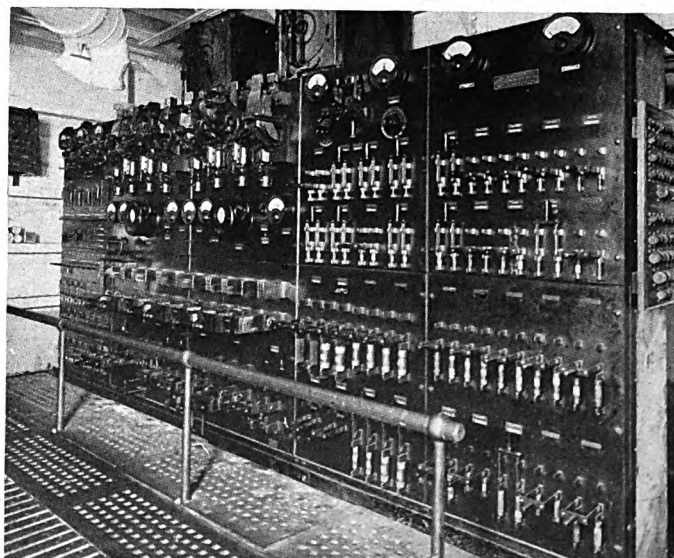
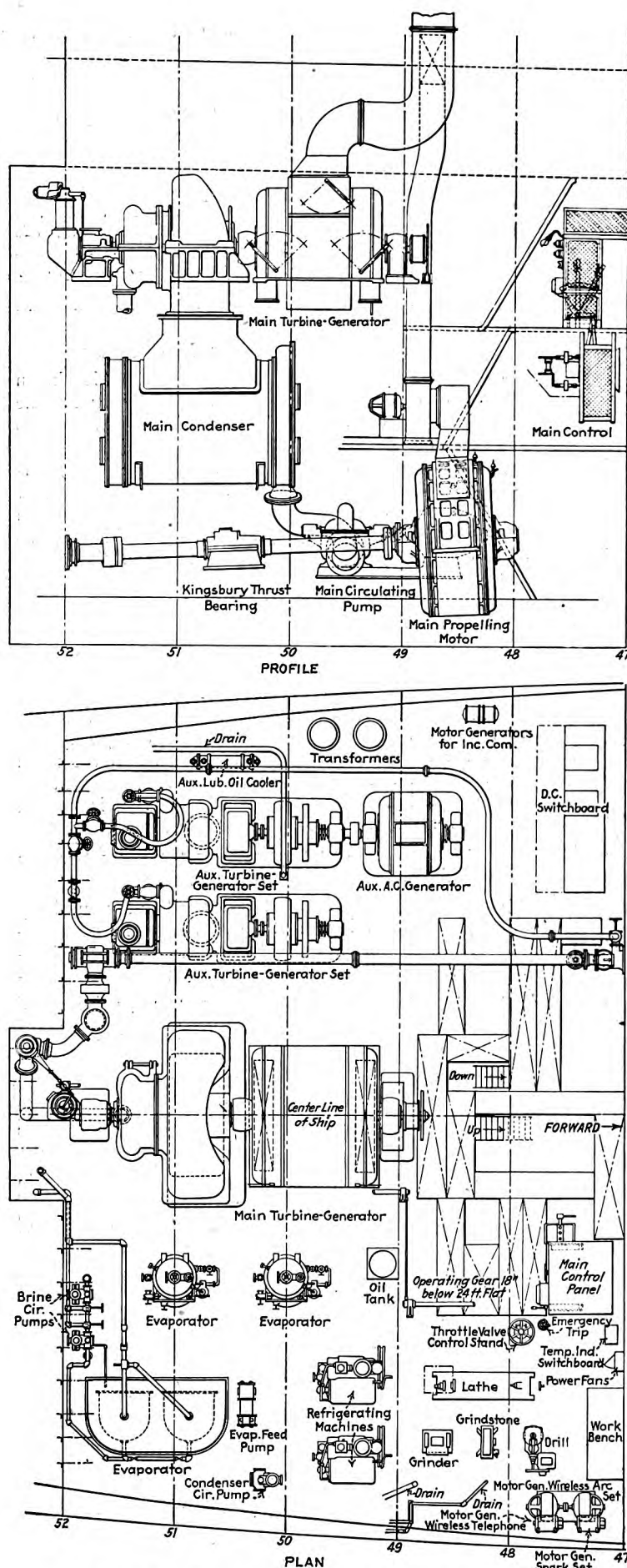


Fig. 6.—Direct Current Switchboard Controlling Ship's Light and Power Circuits



Figs. 7 and 8.—Elevation and Plan of Engine Room

to the auxiliary exhaust line. The excess steam above that required for feed heating and other purposes, when operating under this condition, is relieved to atmosphere through a spring loaded valve which automatically opens when the pressure in the auxiliary exhaust line rises above a predetermined value. The auxiliary condenser circulating and wet and dry air pumps are both steam driven.

The maximum lighting and power load of the vessel is such that only one set is required to operate at a time, thus always leaving one set in reserve. The alternating current auxiliary generator, which is used for propulsion in case the main turbine generator may become disabled, is arranged to be connected to the armature shaft of the outboard auxiliary generator. This is accomplished by means of a special flexible coupling which can be quickly engaged.

The direct current switchboard is located along the forward engine room bulkhead. This board consists of two generator panels and two lighting and power distribution panels. Provision is also made for supplying excitation for main generators and motors from this board.

On the starboard side of the 28-foot flat are located the ice machines, evaporators and machine shop.

MAIN CONTROL PANEL

The main control panel is located along the forward side of the engine room bulkhead, slightly to starboard on the same flat.

The contactor groups are suspended directly beneath the operating panel. The main cables connecting the main generators and propelling motors with the contactor groups are carried beneath the operating platform.

The main propelling motors are located in the engine room as far forward as possible in order to allow space for the turning gear, main thrust bearing and torsion meters and also to facilitate withdrawing the tail shaft without disturbing the main propelling motors.

VENTILATION OF GENERATOR AND MOTORS

Circulating air for dissipating the heat losses of the main generator and motors is taken from the engine room space. In case of the main generator the air is drawn through a suitable opening on the under side of the generator by means of fans built integral with the generator rotor. The air is forced through the air gap and passes out radially through suitable ducts built in the rotor punchings. The heated air is then forced through suitable ducts to the outside atmosphere.

In the case of the main propelling motors, the air from the engine room is drawn through screened openings in the end shields of the motor by means of a direct current motor-driven fan located just above and connected to the stator frame of the motor by suitable housing. The heated air is exhausted through a trunk which connects with the generator exhaust trunk and leads to the outside.

This arrangement of ventilation also aids greatly in ventilating the engine room by producing a constant change of air. Provision is also made for recirculating the heated air back into the engine room in case the temperature of incoming air is too low for the operating personnel.

The main propelling machinery as installed on this vessel, aside from the fact that special care has

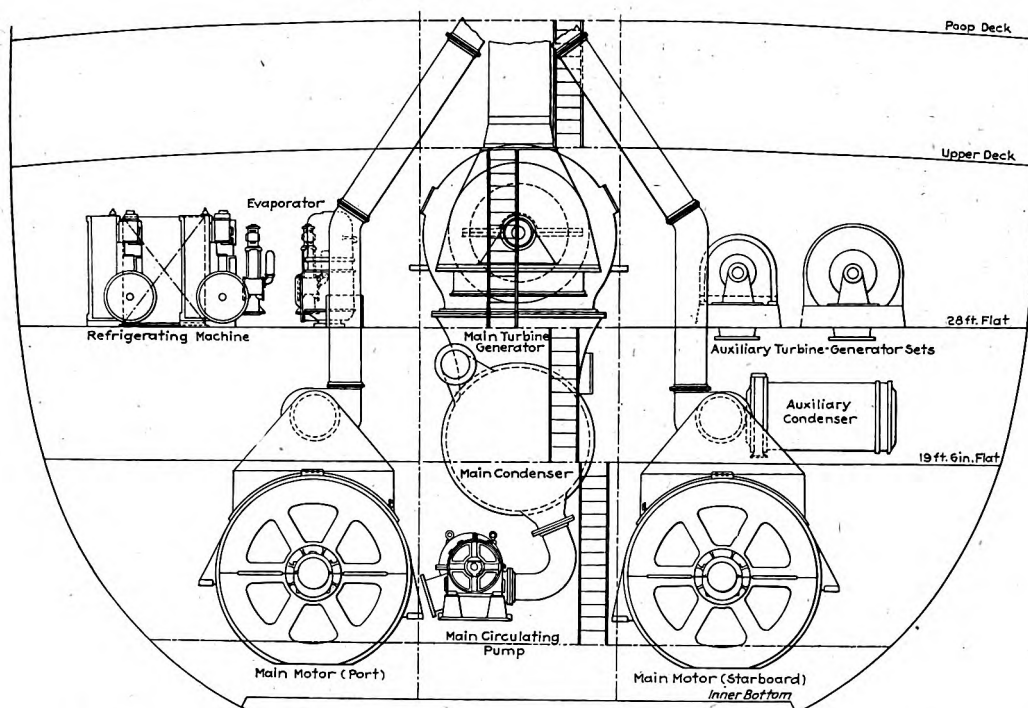


Fig. 9.—Transverse Section Through Machinery Space at Frame 48, Looking Aft

been taken in design in order to produce apparatus that is well adapted for marine service in regard to accessibility, rugged construction and the use of high class insulating material for electric circuits, has several outstanding features that point to the rapid progress that is being made in the adoption of electric machinery for propulsion of ships.

FIRST TWIN SCREW VESSEL TO USE SYNCHRONOUS MOTORS

The *Kamoi* represents the first twin screw vessel to employ the use of synchronous motors. The first application of the synchronous motor for ship propulsion was successfully demonstrated on the S. S. *Cuba* in 1920, a single screw, 3,000 shaft horsepower express passenger ship. This was followed in 1921 by four 2,600 shaft horsepower single screw Coast Guard cutters. The success of the synchronous motor for this type of drive was made possible only after the amortisseur winding had been properly developed and applied in order to get the necessary torque characteristics, peculiar to ship propulsion, for starting and reversing.

MAIN TURBINE GENERATOR OF THREE-BEARING TYPE

The main turbine generator is the first marine set of its capacity to employ the three-bearing type of construction in which the generators and turbine rotors are connected by a rigid coupling and supported by one middle and two end bearings. This feature shortens the length of the set, and, therefore, decreases the weight and space occupied under that required for a four-bearing set of equivalent capacity.

NEW LONG RANGE MECHANICAL GOVERNOR

The main turbine is also equipped with a new type, long range mechanical governor, capable of holding the speed from 25 percent to 107 percent normal. The turbine speed is controlled by means of a hydraulically operated controlling valve located in the main steam line, which is actuated by means of a relay type pilot valve connected with the long range governor. The control of this governor is connected electrically with the main control panel, thereby giving the operator absolute control of the turbine speed for maneuvering the vessel.

In this type of drive, it is found desirable to do maneuvering which involves starting, stopping and reversing of the

motors at approximately 25 percent speed of the main generator. A limit switch has therefore been provided in connection with the control of the variable speed governor to open the control circuit when the setting of the governor is such as to maintain 25 percent speed. A limit switch has also been provided on the upper extreme, so adjusted that the speed maintained by the operating governor cannot rise appreciably above normal. By actual test, it has been found that the speed adjustment of this governor can be regulated from the full speed setting to 25 percent speed setting in approximately 12 seconds.

Two hand valves for controlling groups of first stage nozzles have been provided on the main turbine. These nozzles are arranged in groups of eleven, always open, five under one hand valve and three under the other. For economic, continuous operation, different combinations of nozzles may be selected to give desired speeds, in which case, the variable speed governor may be adjusted a few percent above that speed. In this condition, the operating valve, which is controlled by the mechanical governor, is in the wide open position and all unnecessary throttling from the

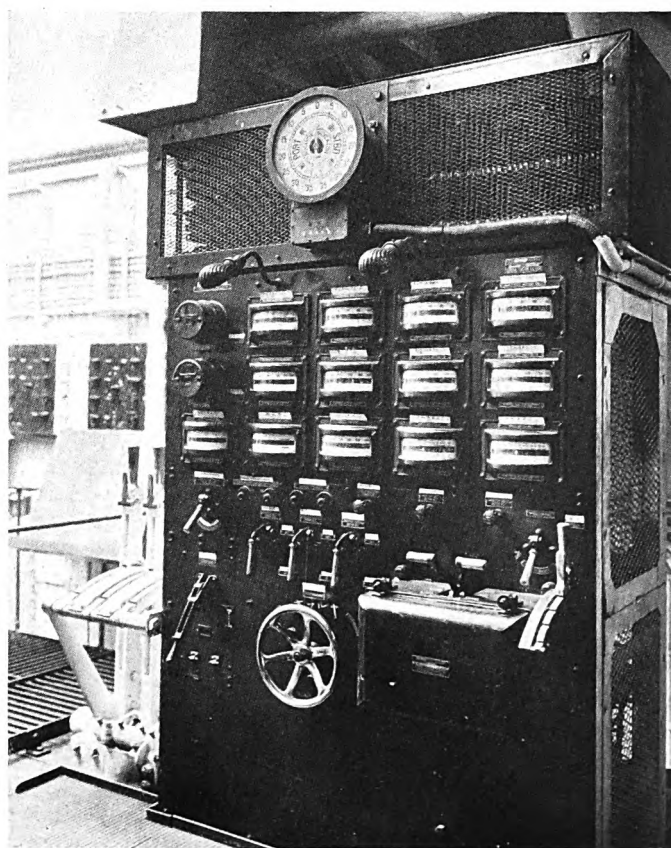


Fig. 10.—Propulsion Control Panel

main steam line to the turbine bowl is eliminated and the first stage nozzles will therefore be operated most efficiently. In case of heavy seas which result in wide variation of load, the turbine can only rise in speed until the operating governor comes into play. This automatically prevents the turbine from overspeeding. When the load is increased, the operating valve again opens, but the maximum steam flow is determined by the given nozzle setting. This resolves itself therefore into a constant steam flow condition, where the variable speed governor becomes a speed limiting governor. In this connection, it is obvious that a vessel with this type of speed control is able to maintain a higher average speed in rough seas than a type of control depending upon manually operated gear.

EMERGENCY GOVERNOR FITTED

The turbine is also equipped with an emergency governor which is mechanically connected with the main throttle valve and set to trip at 120 percent normal speed. This governor also has the dual function of relieving the oil pressure on the hydraulically operated controlling valve, thereby affording double protection in case of emergency. The controlling valve is also arranged to close and shut down the turbine in case of failure of the oil supply.

Gravity tanks have been installed in connection with the lubricating system, arranged with suitable valves, so that in case of failure of the lubricating oil supply, the main turbine bearings are supplied from the gravity tanks for a sufficient length of time to bring the turbine to rest.

CABLES

The terminals of the main generator are connected to the high voltage control group by two 1,250,000 circular mil cables per phase. The motors are connected with the high voltage control group by one 1,250,000 circular mil cables per phase. These cables are especially constructed for marine service, insulated with varnished cambric, reinforced rubber jacket and armored with phosphor bronze tape.

The high voltage control group consists of ten air brake contactors, so arranged that the motors may be cut in, out or reversed, at the will of the operator. The low voltage control group consists of eight air brake contactors arranged for controlling the excitation for the main generator and motors. Contactors of both groups are normally operated electrically by means of a controller located on the front of the operating panel. Manual levers, located adjacent to the operating panel, are provided for actuating the contactors in case of emergency. Mechanical interlocks are provided to prevent using both systems of control at the same time.

HOW THE SHIP IS OPERATED

The controller which is normally used for operating the ship consists of a selector handle for each motor, these handles each having three positions, "Off," "Ahead" and "Astern." There is also provided a field lever with four positions, "Off," "1," "2" and "Run." The motor selector handles are so interlocked with the field lever that they cannot be moved except when the field lever is in the "Off" position, which provides that no high voltage circuits can be interrupted under voltage. By means of the motor selector handle, the operator selects the condition of operation of the motors, "Ahead," "Stop" or "Astern." The operation actuates by means of solenoids, the contactors of the high voltage group and closes the proper circuits between the generator and motors.

The first position of the field lever actuates the main generator field contactors which closes the circuit of the 225 volt bus. This places double excitation on the main generator for starting, the motor field being open, the motors start as induction motors on the special squirrel cage winding.

After the motors have reached a constant speed, the field

handle is moved to position No. 2. In this position, the contactors in the motor field circuit are connected to the 112 volt bus, giving normal excitation on the motors and double excitation on the generator. With this position, the motors pull into step instantly and the field handle is moved to the "Run" position. This places normal excitation on the main generator supplied from the 125 volt bus.

The field current of the main generator and motors may be adjusted independently or simultaneously by means of a hand wheel on the front of the operating panel, a clutch and gear mechanism being provided to connect the respective rheostat arms with the hand wheel.

INSTRUMENTS ON OPERATING PANEL

There are provided on the front of the operating panel, Fig. 10, the following instruments and meters by which the operator may observe at all times the exact status of operation:

1—Polyphase indicating wattmeter for determining output of main generator.

2—Direct current ammeters, one for each main propelling motor, arranged with selector switch to read current in all phases.

1—Alternating current voltmeter for main generator.

3—Direct current ammeters, one for each main generator and motor field.

1—Temperature indicator for main generator field.

1—Excitation indicator for determining the degree of excitation required for holding the motor in step.

1—Alternating current ammeter to determine flow of current to ground through generator neutral.

3—Speed indicators of the magneto type, one for each main generator and motor.

There are also provided two relays which are used in connection with the protective system which automatically opens the generator field contactors in case of abnormal unbalance of phases, or a ground on any part of the high voltage circuits including generator and motor windings.

TEMPERATURE DETECTORS

Temperature detectors are located in the armature windings of both main and auxiliary generators as well as the motors. The detectors are suitably imbedded in the slots adjacent to the coil by which the actual temperature of the coils may be determined. There are provided six detectors for each unit, same being connected to a suitable temperature detector panel, located near the control station. The temperature coils are so arranged that they may be connected separately to an instrument which indicates the temperature in degrees Centigrade.

New Conduit for Electric Wiring

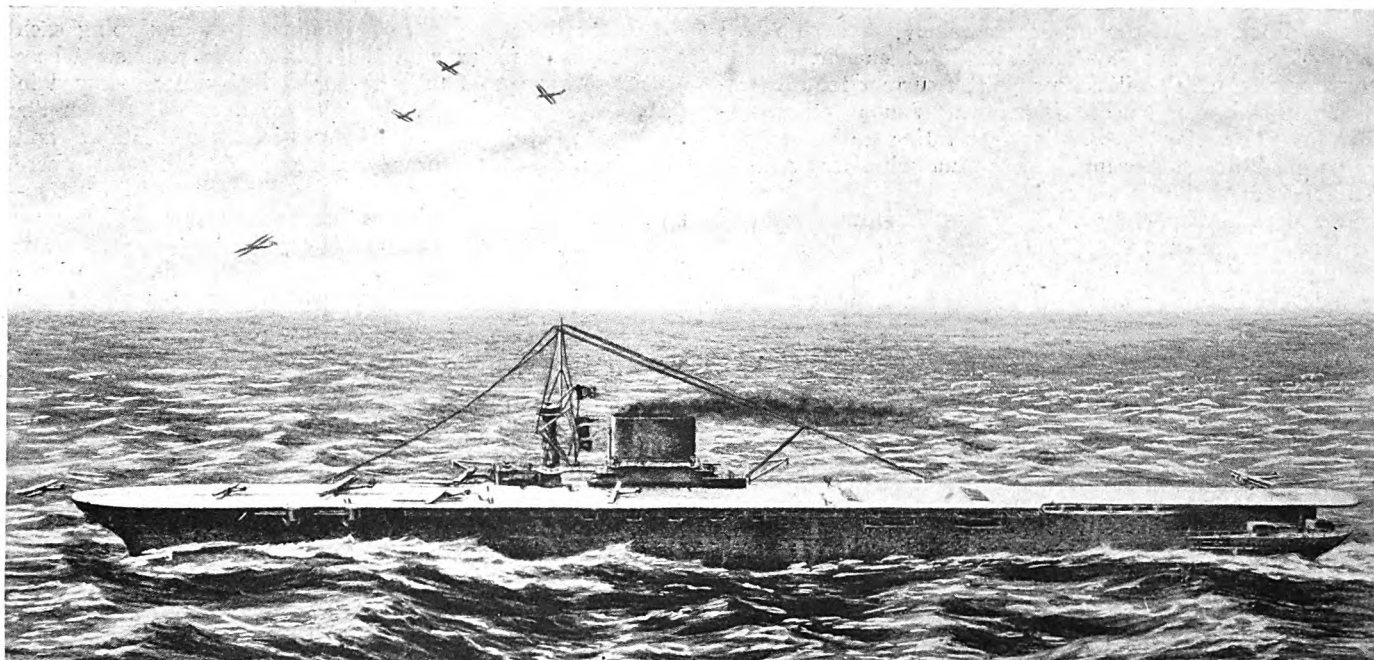
THE American Wiremold Company, Hartford, Conn., has recently been introducing a new product, "Wiremold conduit," to naval architects and shipbuilders for concealing electric wires on the surface in cabins and staterooms. It is a rigid, thin wall tube made in three and four wire



Section of Wiremold Conduit

sizes and furnished in ten-foot lengths with couplings. The wires are fished in after the conduit and base plates of fittings have been secured in position.

This system is expressly designed to harmonize with joiner work, is finished in an attractive neutral tint and can be readily retinted to match other colors, thus avoiding conspicuousness. It is inexpensive, easily installed and has already been used on numerous small craft.



Sketch of 33-Knot Airplane Carrier Now Under Construction for the United States Navy

Powerful Airplane Carriers Building for U. S. Navy

Electrically-Driven Battle Cruisers *Saratoga* and *Lexington* Being Converted Into Floating Airplane Fields—Will Have Speed of 33 Knots

EVEN the group of electrically driven fighting vessels that includes the U. S. S. *Maryland*, the most powerful battleship in the world, will be excelled in propelling power, speed and length by the two airplane carriers which are now building for the United States Navy and which will be launched in about a year and a half. Originally, these two vessels were to have been the battle cruisers *Saratoga* and *Lexington*. The modification of America's naval program, due to the decisions reached at the Conference on the Limitation of Armament, led to the conversion of these battle cruisers into airplane carriers.

The Navy at present has but one airplane carrier, the U. S. S. *Langley*, which has just been commissioned and given its sea trials in Chesapeake Bay. The *Langley*, which is named after the scientist who made the first practical investigation of aeronautics, was rebuilt from the old collier *Jupiter*, the first vessel of the Navy to be equipped with the electric drive.

The two aircraft carriers being built from the battle cruisers will be literally floating airplane fields. They will also be floating electric generating plants. As naval vessels they will be the longest in the world.

MAIN PARTICULARS OF THE VESSELS

They will be capable of developing 180,000 horsepower, through four electrically driven shafts. This is almost six and a half times greater than the propelling power of the *Maryland*, representative of the Navy's present speediest class of capital ships, which is rated at 28,000 shaft horsepower.

The speed of the airplane carriers will be over 33 knots, or 12.6 knots more than the speed of the *Maryland*. Their length at the waterline will be 850 feet and they will have a beam of 105 feet. The *Maryland* is 600 feet long at the

waterline, with a beam of 97½ feet. The length of the *Langley* is 520 feet, and her beam is 65 feet.

The vessel which was to have been the battle cruiser *Saratoga* is building at the Camden, N. J., shipyard of the New York Shipbuilding Corporation, while the vessel originally designed as the *Lexington* is being constructed at the Fore River shipyard of the Bethlehem Shipbuilding Corporation at Quincy, Mass. The launchings of these ships, as airplane carriers, are expected in the summer of 1924.

PROPELLING MACHINERY

Continuing the policy first adopted in the case of the *New Mexico*, these vessels will both be electrically equipped throughout by the General Electric Company. The propelling machinery, designed with the utmost care by the engineers of the General Electric Company, and the same, barring minor alterations, as was planned for the original battle cruisers, will consist of four turbine generator sets, supplying current to eight electric motors in each vessel. The turbine generators will be operated by steam from sixteen oil-fired boilers and each will have a rating of 40,000 kv-a., 5,000 volts three-phase, 1,770 revolutions per minute.

The motors will be connected in pairs to each of the four propeller shafts. Each pair of motors will have an aggregate weight of 440,000 pounds. Each motor will have a capacity of 22,500 horsepower and will measure fifteen feet in diameter.

The total weight of the propulsion apparatus will be 2,100 tons. Each generator set will be about 40 feet in length and each pair of motors about 34 feet.

The work that is being done on the propulsion machinery for these two airplane carriers, is being carried on under the direction of Admiral J. K. Robison, Chief of the Bureau of Engineering, U. S. N.

In addition to the propulsion machinery, each ship will be provided with six 750 kilowatt, direct current turbine generator sets, which will furnish direct current for all electrical purposes except main propulsion. Among other purposes to be served by this auxiliary generating equipment will be the operation of steering gear, anchor windlass, ventilation fans and lighting systems.

The airplane carriers will be among the first vessels of the Navy to embody the unique surface cooler system of ventilating their electrical machinery. This is a new application, developed by engineers of the General Electric Company originally for war ships, and now modified for use likewise in generating stations on land.

MACHINERY VENTILATING SYSTEM

On the aircraft carriers each of the four generators will have sixteen cooler sections and each of the eight motors will be provided with twelve, making a total of 160 cooler sections for the entire vessel. The coolers will make the electrical units entirely self-contained.

Formerly, a system of air ducts passed from the electrical machinery up through the hull of the vessel to the deck. Cooling air was drawn in through one set of ducts, and after passing over the electrical units and absorbing the heat, was sent out through another set. For vessels of 180,000 horsepower capacity, the duct openings would necessarily be numerous.

But the ducts are entirely eliminated by equipping each generator and motor with the radiators or coolers. These consist of a series of tubes through which water, pumped in from the sea, is circulated. The air that comes from the electrical machine is cooled by passing over the tubes, and the same air is then returned to the electrical apparatus, where it is again heated and again passed over the cooler, completing a cycle that is in continuous operation. The water in the cooler tubes, upon absorbing the heat from the air, is pumped out again into the sea. The elimination of the duct openings will result in vessels that are better protected from attack and are more seaworthy in storms.

RADIO EQUIPMENT

Like the *Langley*, these vessels will give particular attention to radio operations. Although to all appearance they will have decks that are almost unobstructed by masts and arials, nevertheless, they will be completely fitted out for sending and receiving radio messages. Their arials will be run to the deck from a single topmast, which can be lowered when necessary.

Below decks provision will be made for storing and maintaining a considerable number of airplanes and elevators and cranes will be installed with which to hoist them up from below, preparatory to hopping off from the flying deck. The flying decks will be unbroken except for a combination funnel enclosure, set off at one side of the hull.

Diesel Engined Tug Displaces Steam Craft

THE Abitibi Power and Paper Company, Ltd., Montreal, Canada, which operates a large paper mill at Iroquois Falls, Ontario, recently commissioned Ralph E. Winslow, naval architect, Atlantic, Mass., to design a new motor towboat to replace three steam towboats which the company formerly operated. The new tug, the *F. H. Anson*, is designed to tow booms of logs containing about 3,500 cords of wood for pulp wood from Couchiching Falls to Twin Falls, a distance of about twenty-two miles on the Abitibi river, Canada.

As it was expected that the tug would have to make a round trip each 24 hours, accommodations were provided for two crews as well as for extra raft men and company officials, although the tug itself could be operated by a crew of four men. As on this run the draft is unrestricted, the vessel was made deep enough to immerse a four-blade Columbian bronze propeller 6 feet 6 inches diameter by 4 feet 6 inches pitch. The principal dimensions of the tug are:

Length overall	83 feet
Length on waterline	77 feet 4 inches
Beam	20 feet
Draft	9 feet 6 inches
Shaft horsepower	300

The machinery equipment consists of a direct reversible 6-cylinder 12 15/16-inch by 18-inch Winton Diesel engine developing 300 brake horsepower at 210 revolutions per minute, a Winton auxiliary air compressor driven by a 12-horsepower motor, an Exeter bronze fuel oil transfer and service pump driven by a one horsepower motor, an Exeter fire, bilge and general service pump driven by a 5 horsepower motor and a 10-kilowatt Crocker-Wheeler electric generator driven by a 15 horsepower Frisbie engine. There is also a 25-cell 32-volt Edison storage battery and a 14-inch low-volted searchlight.

The hull was constructed in Northern Ontario under the supervision of the designer. The scantlings are in excess of Lloyd's requirements. The keel, frames, stem, stern frame,

etc., are of yellow pine and the ceiling and decks of Oregon pine. Three watertight bulkheads divide the hull into four watertight compartments. The fuel tanks hold 4,200 gallons.

Accommodations are provided for 12 men, six in the fore-castle, two in the engineer's stateroom, two in the captain's room and two in the company officials' room. In addition, there are the usual mess room, galley, storerooms, etc.

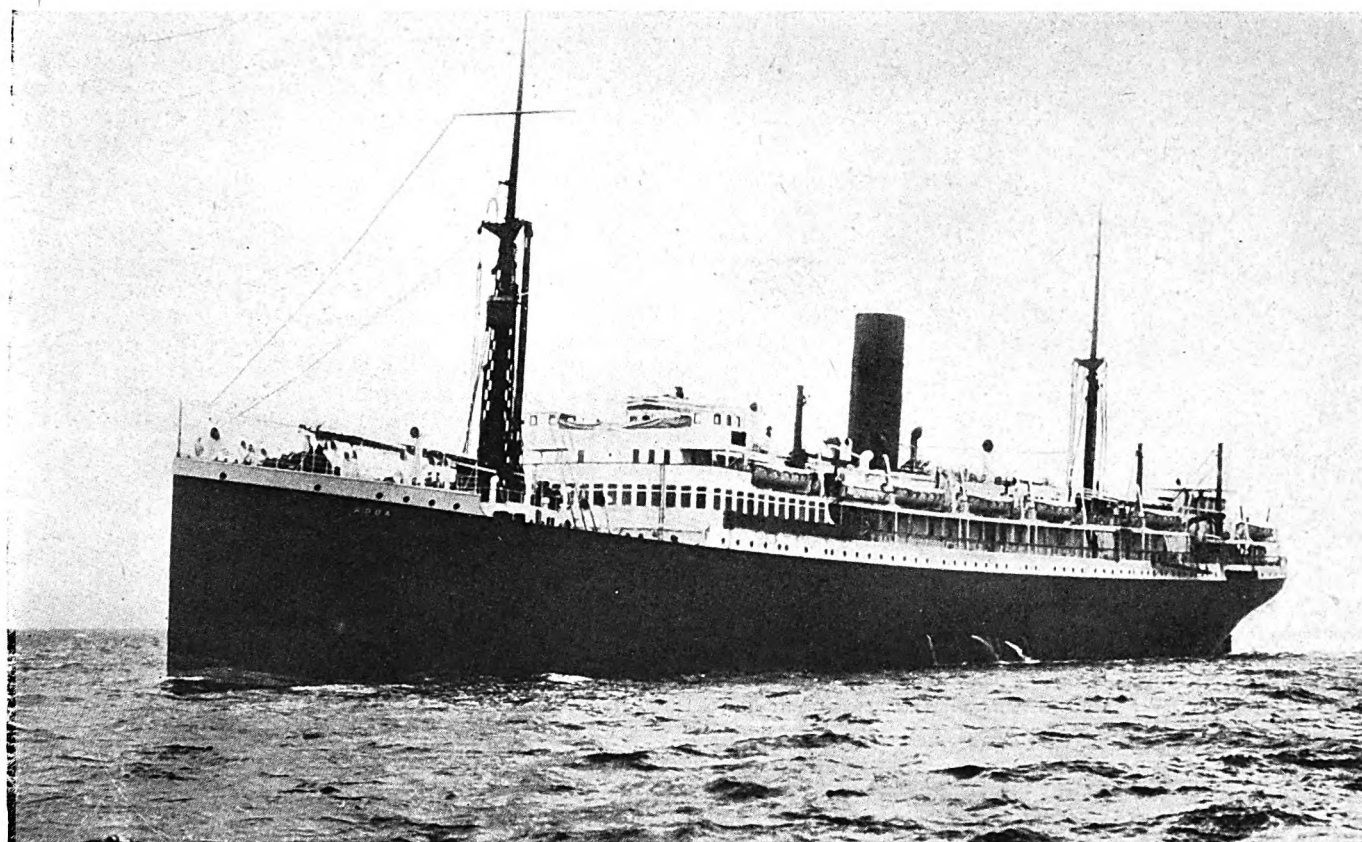
PERFORMANCE OF THE TUG

When running light the tug has a speed of 13 miles per hour. While towing rafts of logs about one-half mile long and about 800 feet wide the speed is 1 1/4 miles per hour.



Diesel Engined Tug F. H. Anson

The fuel consumption at 260 revolutions per minute, corresponding to 375 brake horsepower, is 24 gallons per hour; at 196 revolutions per minute, corresponding to 300 brake horsepower, 22 gallons per hour; and when towing at 176 revolutions per minute, corresponding to 287 brake horsepower, 18.5 gallons per hour. During the first six days of operation the tug delivered to the mill 14,500 cords of pulp wood, which the owners state is more than the three steam tugs, which the Diesel engined tug has replaced, could deliver in ten days' time.



Twin Screw Motor Passenger Liner Adda

Recent Motorship Building in Europe

New Motor Passenger Liner Adda Has Many Interesting Features—Danish Motorship Arizona Completes Her Trials

By Our Special London Correspondent

IN view of the fact that only a short time ago, an order was placed by the Union Steamship Company, of New Zealand, with the Fairfield Shipbuilding Company on the Clyde for the construction of a 20,000 ton motor passenger liner, the completion of the trials of the motorship *Adda* towards the end of November aroused a great deal of interest in shipping circles. The *Adda* is the finest and largest motor passenger liner that has yet been built, although she is not very different from the *Aba* (described in the January, 1922, issue of *MARINE ENGINEERING AND SHIPPING AGE*), which was placed in service a year ago.

The *Aba*, however, although holding the honor of being the first motor passenger liner in the world, was a converted cargo ship and is therefore perhaps not quite so fine an example of the shipbuilders' art as the *Adda*.

This vessel is to engage upon the regular mail and passenger service of the Elder-Dempster Line between Liverpool and the West Coast of Africa, and is the finest ship now operating in that trade. She has a displacement 12,800 tons on a length of 450 feet. Her beam is 57 feet and her molded depth to the awning deck is 34 feet 6 inches. She is designed to maintain a speed of from 13 to 14 knots and has accommodations for 225 first, 74 second and 32 third class passengers.

From an engineering point of view, she is remarkable in many respects, quite apart from the adoption of internal combustion engines for propulsion. Coal has been entirely

eliminated, and electricity is used throughout for all auxiliary purposes, except for the main cooking range in the galley, and in this, oil fuel is utilized.

MAIN PROPELLING MACHINERY

The main engines consist of two of the standard Harland and Wolff sets, as built under license from Burmeister and Wain. They are eight-cylinder machines of normal type, developing 6,000 indicated horsepower at from 110 to 115 revolutions per minute, and they are similar in practically every particular to the motors which were built in the United States by the Wm. Cramp and Sons Ship and Engine Building Company and installed in the *Californian* and *Missourian*. In these large engines, however, it is found desirable to have two separate injection air compressors driven off the end of the crankshaft and arranged in tandem. This is a tacit recognition of the fact that the air compressor is now perhaps the most vulnerable part of a Diesel engine's equipment, and in the case of the engines of the *Adda* one of the compressors is sufficient to supply all the injection air necessary, so that, if there is a breakdown of an air compressor, the engine need not be stopped or even slowed down to any extent.

On trials these motors are found to have a fuel consumption of about 0.3 pound per indicated horsepower hour and the total amount of fuel required daily for the operation of the vessel, including that used for all auxiliary purposes, does not amount to more than 20 to 22 tons for a speed of



First Class Dining Saloon of Motorship Adda

about $13\frac{1}{2}$ knots. The diameter of the cylinders is 29.13 inches and the stroke is 45.28 inches.

STANDARDIZED AUXILIARY SYSTEM

Harland and Wolff, in the larger motorships which they have built for many British shipowning concerns, have standardized an auxiliary system, which, although apparently expensive, is almost ideal for the purpose. This arrangement is adopted in the *Adda* where there are four separate electric generating sets, arranged on the port side of the engine room in line. Each of these plants is driven by a three-cylinder four-cycle Diesel engine of 150 brake horsepower running at 300 revolutions per minute, the dynamo having an output of 100 kilowatts at 220 volts. The power is taken to a large switchboard mounted on a platform at the after end of the engine room and an interesting feature is the fact that the emergency lighting set which is installed in the steering gear house can be connected on to the main switchboard in the engine room to supply additional power if required.

The unusual plan has been adopted of having the emergency set an exact duplicate of the generating plants in the engine room, so that there are altogether five 100-kilowatt dynamos in the ship. This large plant is quite necessary, as may be imagined when it is stated that the motors are coupled up to the electric circuit and would, if all were operating at the same time, require between 800 and 900 kilowatts.

As is usual in Burmeister and Wain type equipment, all the auxiliaries required for the operation of the main engines are separately driven by electric motors. Unlike the American system, the cylinder jackets are cooled with salt water and the pistons with fresh water, separate electrically driven pumps in duplicate being provided for the circulation of the water.

The fresh water is passed through a cooler around which the sea water circulates before it enters the pistons. Lubricating oil is supplied from three small rotary pumps coupled to high speed electric motors and the bilge and general service pumps which are of the plunger type are also electrically driven.

AMPLE MANEUVERING POWER

British shipowners are very conservative in their ideas of the requirements of starting air for maneuvering purposes. As a result of this, as on many other British ships, a couple of large auxiliary maneuvering air compressors are installed, whereas in corresponding Scandinavian and American ships one is deemed sufficient. Each of these compressors, which is of the two-stage type delivering air at about 350 pounds per square inch, is driven by a motor of 180 horsepower and runs at 250 revolutions per minute.

The *Adda* carries 5,000 tons of cargo in addition to her passengers, and the cargo handling equipment comprises 12 electrically driven winches of the four-ton type. The controller for each individual winch is mounted on the top of the casting, but all the contactors and resistances are located in one large contactor house on deck. This is a usual system and although it occupies a good deal of space on account of the necessity of providing a large housing, it is found more satisfactory than the provision of a rheostat on each of the winches.

ACCOMMODATIONS

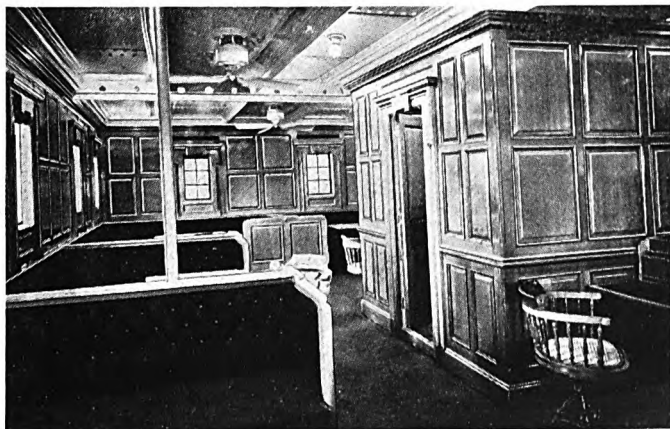
A feature of the accommodation is the number of single berth staterooms which are located on the bridge deck. These rooms are paneled in white and are furnished with a single bed of the cot type, a wardrobe and easy chair. On the awning deck there are two sets of suites each accommodating two passengers. Pullman berths are fitted in the suites and each has its private bath.

The double berth cabins are arranged on the tandem principle giving every room access to the ship's side. Each first class stateroom has a fresh water supply and basin with a special discharge which eliminates the necessity for a slop tank.

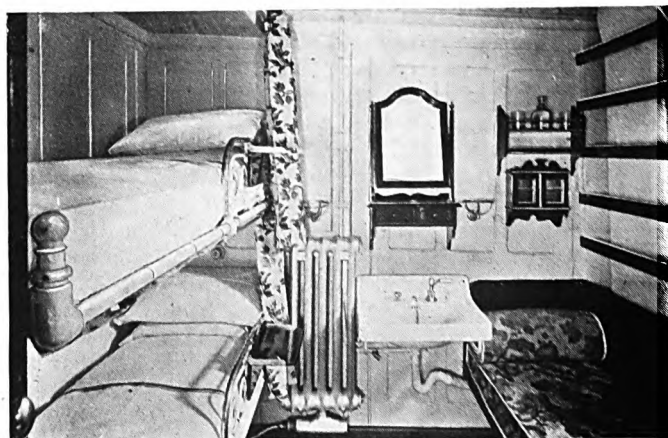
The second class cabins are unusually attractive to this class of travelers and are arranged in two- and four-berth rooms located on the main deck aft of the second class dining saloon. They are fitted with folding lavatories, wardrobes and the floors are covered with linoleum, with carpet and carpet runners.

VENTILATION

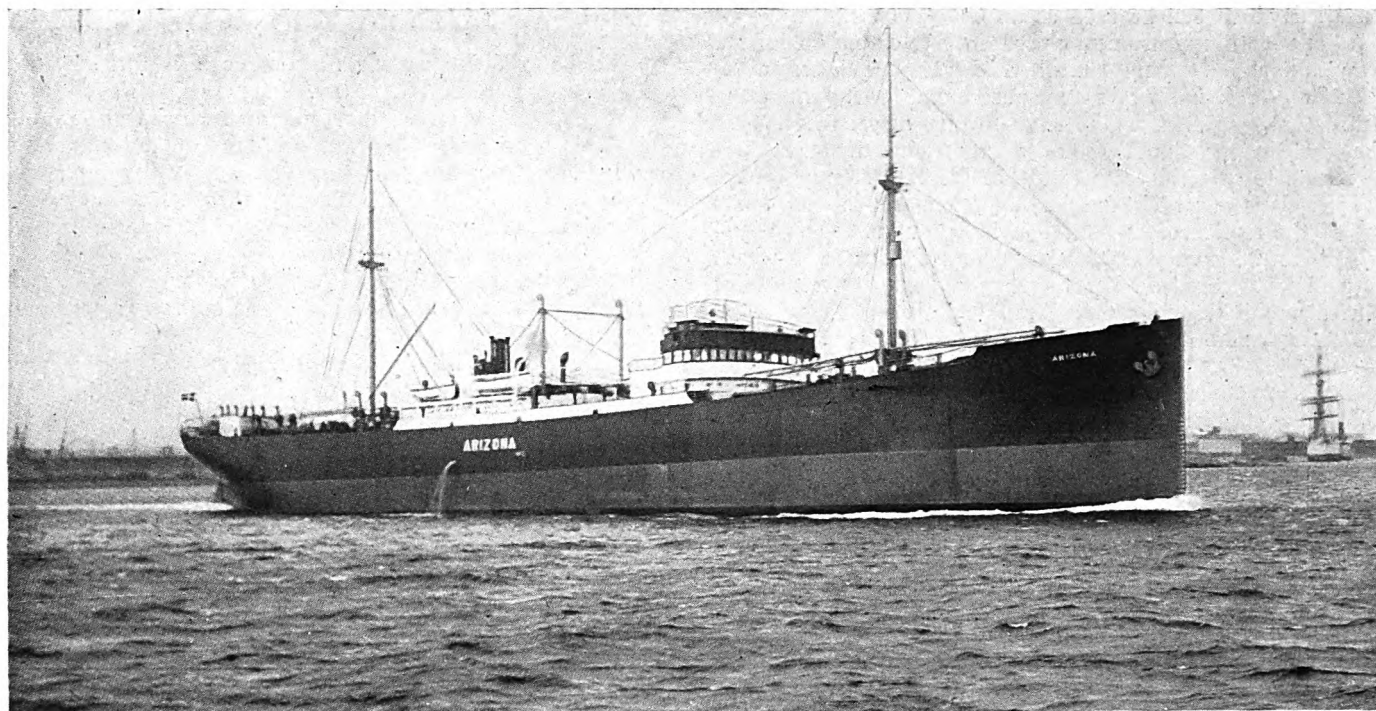
One of the most complete systems of forced ventilation has been installed so that the passenger in the privacy of his cabin may enjoy, with the aid of forced draft and fans, any



Second Class Smoking Room of Motorship Adda



First Class Cabin on Motorship Adda



Danish Motor Cargo Ship Arizona

particular degree of fresh breezes that he desires. There are 19 electrically driven Sirocco fans which are located on deck employed in the ventilation system and each cabin is supplied with individual fans under the control of the passengers.

SAFETY FEATURES

Twelve fully equipped lifeboats and a motor launch are installed which will take care of all on board in a case of emergency. These boats are handled by the Welin semi-rotary type of davit. Watertight doors below the main deck are electrically controlled from the bridge. Eight watertight bulkheads are fitted below the awning deck dividing the hold into seven spaces and above this deck steel bulkheads with fireproof doors divide the passenger accommodations into fireproof compartments. Chemical fire extinguishers are distributed throughout the passenger accommodations and a fire alarm system is installed that will immediately apprise the officer on watch of the location of any incipient blaze. Emergency power and light are secured by a 100-kilowatt dynamo installed on the awning deck which is capable of supplying all the essential services in cases of an emergency.

AN ELECTRICAL SHIP

Windlasses, cargo winches, steering gear, all engine room auxiliaries, fans, galley appliances and laundry appurtenances are driven by electric motors. Electric vapor radiators are installed in both passenger and crew space. These radiators are similar to the ordinary hot water or steam type except that the hot water is heated by an electric coil beneath each radiator. It is claimed that the loss of water is extremely small and that they are more economical than the central heating system, the average power required being about 1,000 watts.

REFRIGERATION

Insulated cargo and store spaces are fitted in No. 3 hold. Separate chambers are provided for poultry, meat, fish and fruit. The refrigerating machine was made by J. & E. Hall, Limited.

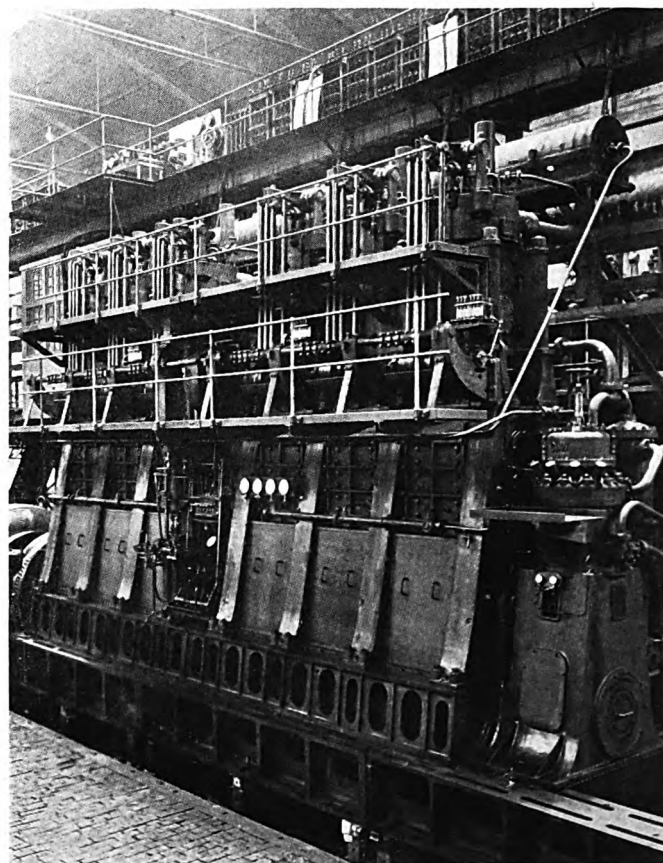
INTERESTING FEATURES

The hospital, which is located on the docking bridge, is

fitted with swing beds which counteract the rolling of the ship.

The laundry has been designed to take care of the passenger washing, a feature that will be appreciated by travelers.

In addition to the 12 electrically-driven cargo winches, a powerful warping winch with large drum ends has been



Assembly View of Engine of Motorship Arizona

installed which can be used as an emergency steering gear.

The scientific instruments used in navigating include a Clay automatic steering control which prevents errors in the execution of helm orders, pneumercators for taking exact draft, tank gages in engine room to give direct readings of the fuel in the double bottoms, and long distance thermometers to give the temperature in the cold storage rooms.

Fuel oil is carried in the double bottom and in deep tanks aft of the motor rooms. She carries about 820 tons of oil which can be pumped aboard in about 5 hours and which is sufficient to enable her to make a round trip to West Africa and back without refilling.

MOTORSHIP ARIZONA GIVEN TRIAL

The motorship *Arizona*, which has recently completed a trial trip, was built by the Nakskov Shipyard, Nakskov, Denmark, for the United Shipping Company of Copenhagen. The principal dimensions and other particulars of the vessel are:

Type of ship	Cargo
Length between perpendiculars	405 feet 0 inches
Breadth, molded	54 feet 0 inches
Depth	36 feet 6 inches
Draft loaded	26 feet 0 inches
Deadweight capacity	9,100 tons
Stipulated normal average speed at sea	about 11 knots
Stipulated normal consumption of fuel oil per day	9 tons

MACHINERY

Type of machinery	Burmeister and Wain's 6 cylinder, 4 cycle Diesel engines
Number of main engines	2
Cylinder diameter	23.23 inches
Stroke	35.43 inches
Revolutions per minute	140
Indicated horsepower	2,800
Brake horsepower	2,200

The trial results over the measured mile in the Sound, on November 17, were:

Indicated horsepower, average	3,132
Revolutions per minute, average	144.5
Speed, average, knots	11.215

During the consumption test, the main engines developed 2873.6 indicated horsepower at 141.4 revolutions per minute, at a fuel oil consumption of 0.311 pound per indicated horsepower hour, net calorific value being 18,000 British thermal units, including the consumption of auxiliary engines producing the necessary current for the auxiliary machinery, steering engine and electric light.

The machinery is placed amidships and is of Burmeister and Wain's standard type for twin screw ships. The main engines are short stroke, forced lubricated crosshead engines, fitted on the front end with three-stage air compressors supplying the necessary injection air for atomizing the fuel oil.

All auxiliary machinery in the engine room as well as the deck machinery is electrically driven, the necessary current being supplied by three 50-kilowatt Diesel dynamos. The voltage of the current is 220 volts and for the lighting purpose it is transformed down to 110 volts by means of a motor generator.

Each of the generators is sufficient for supplying the necessary current under normal working conditions at sea, whereas two or all three generators have to be started, when the consumption of current is large, i. e., when maneuvering with the maneuvering compressor running or when loading or unloading the winches using much current.

The heating is effected by means of steam produced in a small cross tube boiler, this boiler also being able to deliver steam for fire extinguishing in holds.

The *Arizona* is the fourth motorship in the fleet of the United Shipping Company, Copenhagen, the other three motorships also being furnished with Diesel engines from Burmeister and Wain.

A Nesting Lifeboat With New Features

THE Balsa-Welin nesting lifeboat, manufactured by the American Balsa Company, Inc., Long Island City, N. Y., is a new nesting type boat which, as a result of holding sheer line and keel line parallel and rounding the bilges, can be nested closely together and readily launched.

The keel is built up of a flat outer keel, two angle bar keelsons and an apron plate between the keel and keelsons to which the shell plating is riveted.

The bottom shell is further strengthened by floors flanged to the shell plating and worked over the keelsons from bilge



Nesting Lifeboat

to bilge. These floors are also flanged at the top edge to take the footlings, thus giving a straight walking flat and allowing ample space between the shell and footlings to prevent the accumulation of dirt and rust.

The gunwales are of angle bar construction which increases the strength, durability and rigidity of the boat. As the drop leg of the angle bar is worked on the outside of the shell plating, moisture is excluded from the joint and the rusting away of the sheer strake is avoided.

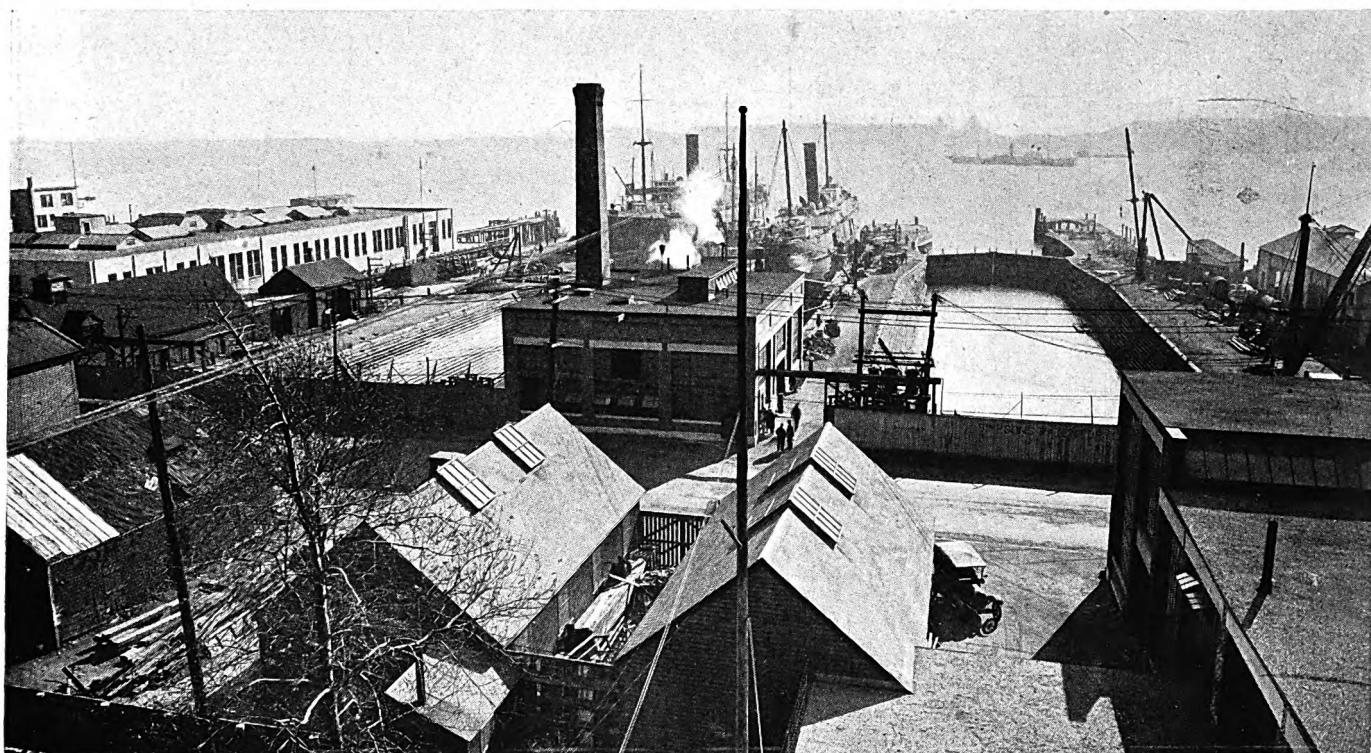
The addition of floors flanged to the shell plating and the installation of angle bar gunwales have resulted in a boat so strong and rigid that in suspension tests the keel deflection is so little that it cannot be measured.

Germans Are Operating Large Motor Sailing Vessels

ACCORDING to a report recently received by the Department of Commerce, several German shipping companies have adopted the policy of building and operating large motor sailing vessels. In former times the installation of motors was restricted to small sailing vessels, but after the seizure of the German sea-going steamers by the allies it was decided that the quickest and least expensive way to increase the efficiency of the German merchant marine would be to install internal combustion engines on the large German sailing ships.

The quick journeys, especially to the West Coast of South America, which large German sailing vessels achieved before the war were remarkable, and the records of these ships were admired everywhere. A large part of their success is attributed to the Deutsche Seewarte (German Observatory), whose sailing manuals, monthly charts and other publications regarding sailing voyages have enabled commanders to choose the most advantageous routes for their trips and take advantage of favorable weather conditions.

The Deutsche Seewarte is also willing to train in a short time, and free of charge, captains and officers of vessels so that they will be able to judge meteorological conditions at sea. This knowledge is especially important to masters of motor sailing vessels in order that they may get the best results out of weather conditions. It will enable them to judge when it is best to use the sails alone, the motor alone or a combination of both.



General View of Simpson Dry Dock Plant, Looking Towards Main Ship Channel in Boston Harbor. In the Center Is the Power House and Pump Room, at the Right the 455-Foot Dry Dock, at the Left the 256-Foot Dry Dock (Unwatered)

Simpson's Patent Dry Dock Company of Boston Merged With Bethlehem Shipbuilding Corporation, Ltd.

THE recent acquisition of the plant of Simpson's Patent Dry Dock Company at East Boston, Mass., by the Bethlehem Shipbuilding Corporation, Ltd., marks another chapter in the history of one of the old ship repairing yards in New England. The history of this plant goes back to the days when the American clipper ships were carrying the American flag to all the ports of the world, and when American bottoms were carrying a large part of the commerce of the world.

The first dry dock, on Marginal street, East Boston, was built in 1853. Three years later the dry dock was purchased

by James Simpson, who established Simpson's Patent Dry Dock Company. Before the Civil War this dry dock was busy with repair work on clipper ships, and during the war much repair work on naval vessels was performed. It is said that the famous ship *Kearsarge*, after the engagement in which it put the Confederate commerce destroyer *Alabama* out of commission, came to this dry dock for repairs and was put into fighting trim.

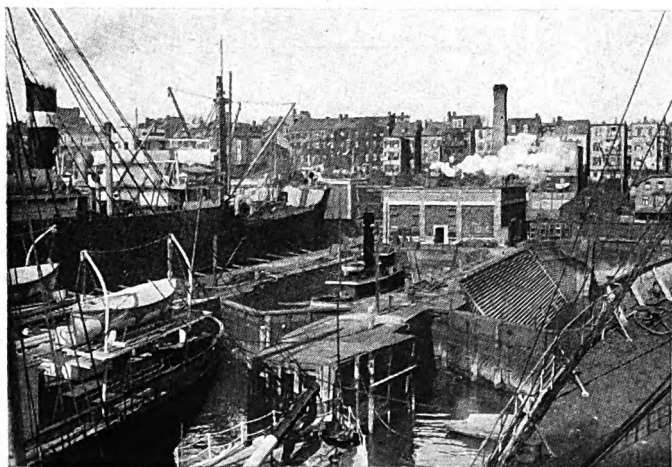
Due to the growth of this business two other dry docks have been built, so that at present the docking facilities include one dock 455 feet long by 81 feet wide, one 256 feet long by 67 feet wide, and a small dock especially suited for tugs, fishing vessels and other small craft, 164 feet in length by 44 feet wide.

Equipment for doing repair work has been added to the plant as it has been developed. Recently a new power and pump house was built; also a well-equipped, modern machine shop. Other shops and equipment available for making all sorts of marine repairs include a boiler shop, paint shop, carpenter shop, blacksmith shop, derricks, etc.

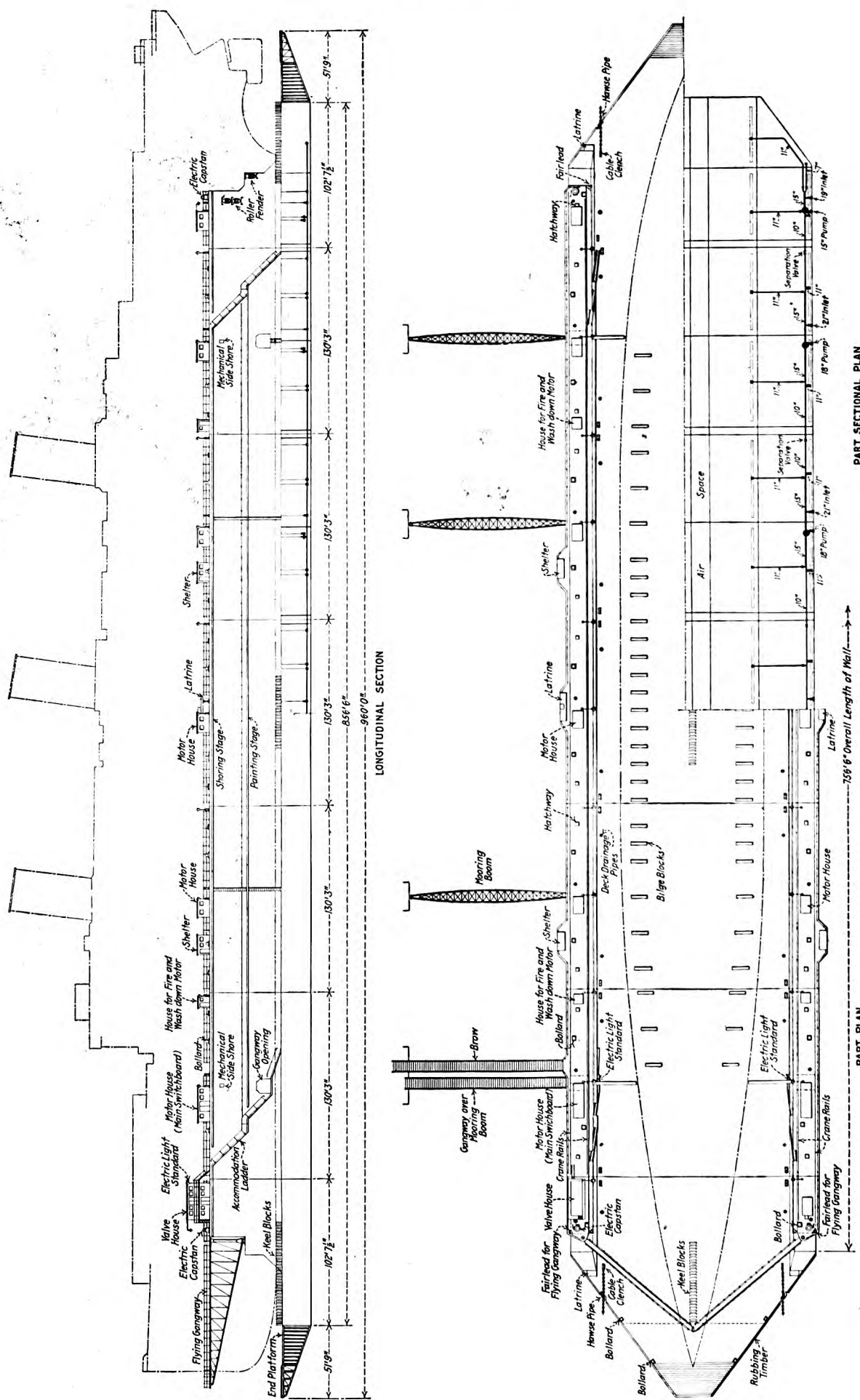
Many well known vessels have been repaired at these docks. During the war a number of German vessels that had been injured by their crews after being interned were repaired here. Among these were the *Willehad*; the *Wittekind*; the *Ockenfels*; the *Iguassa*, a German boat interned in Rio de Janeiro and purchased by an American firm; and the *Don Juan de Austria*, once the private yacht of the Queen of Spain, now a United States Government boat.

This plant will be continued as a separate and complete repair yard by Bethlehem Shipbuilding Corporation, Ltd., and will be known as the Simpson Dry Dock Plant. S. W. Wakeman, general manager of the Fore River plant, has also been appointed general manager of the Simpson Dry Dock Plant.

The operation of this plant gives Bethlehem ship repair facilities centrally located in Boston Harbor, and in co-operation with the company's organization and equipment at Fore River, offers to the shipping industry means for complete service for ship repairing or shipbuilding.



Dry Docks of the Simpson Dry Dock Plant Looking Landward From Deck of Vessel. The 164-Foot Dry Dock is in Center, Between the 455-Foot Dock (at Left) and the 256-Foot Dock (Unwatered) at the Right



Largest Floating Dry Dock in the World Ordered

**All Steel Structure of Sectional Type 960 Feet Long
Will Be Able to Lift Vessel of 60,000 Tons Displacement**

SOUTHAMPTON, England, is to have the largest dry dock of its kind in the world. This dock, the plans of which are shown on the opposite page, will lift a vessel weighing 60,000 tons. As the docking weight of the *Majestic*, the largest ship in the world today, is only 52,000 tons, Southampton will be one of the few ports capable of docking any vessel that is likely to be built for some time to come.

The contract for the construction of the dock has been placed with Messrs. Sir W. G. Armstrong, Whitworth and Company, Ltd., Newcastle-on-Tyne, who will build it ac-

to list, it will be possible to correct it immediately by allowing some of the pumps to work faster than the others.

CENTRAL CONTROL

All of the pumps will be under the control of one man situated in the operating house on top of one of the wings. The valve operating mechanism and recording instruments will be installed in this house so that the operator will be able at all times to ascertain the true level of the dock and how deep she is below the water level at any particular point.

OTHER MACHINERY

The dock will also be equipped with many other appliances, including machinery for supplying compressed air, water pumps for fire service, and cleaning down, electric capstans for warping and hauling and traveling cranes for handling materials and equipment.

A site for the dock has already been selected and dredging operations have commenced. It will necessitate the deepest dredging ever performed, reaching to a depth of 75 feet at high water and 62 feet at low water. The amount of soil to be removed will aggregate 2,000,000 tons.

The dock will be placed quite near to one of the existing quays and two bridges will be provided by means of which the men engaged in repair work will be able to gain access to their work. A large floating crane is also contemplated which will be capable of lifting 75 tons by means of which heavy pieces of machinery can be placed aboard the vessel when she is in drydock.

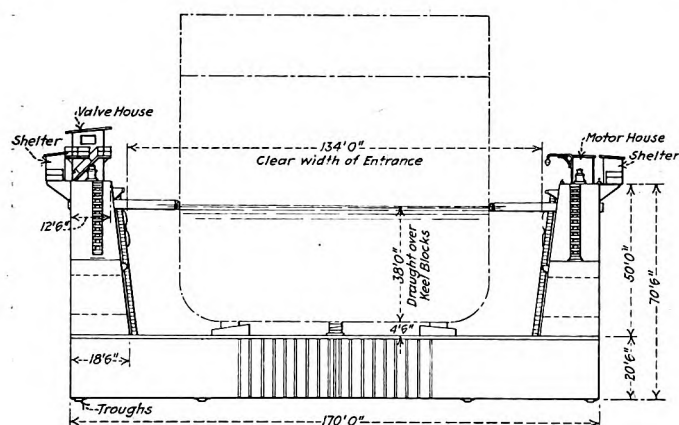


Fig. 2.—End Elevation of 60,000-Ton Floating Dry Dock

According to the plans of Messrs. Clark and Standfield, a firm of engineers that is responsible for the construction of many large floating docks in England and elsewhere.

CHARACTERISTICS

Length overall	960 feet 0 inches
Length over pontoons	856 feet 6 inches
Breadth of pontoons	170 feet 0 inches
Depth of pontoons	20 feet 6 inches
Depth of side walls	50 feet 0 inches
Depth overall	70 feet 6 inches
Length of side walls	756 feet 6 inches
Width of side walls at base	18 feet 6 inches
Width of side walls at top	12 feet 6 inches
Clear width of entrance	134 feet 0 inches
Height of keel blocks	4 feet 6 inches
Draft of water over keel blocks	38 feet 0 inches
Depth of water required at site	65 feet 0 inches
Lifting power	60,000 tons
Weight of steel, about	16,200 tons
Light weight of dock, about	18,000 tons

PUMPING MACHINERY DETAILS

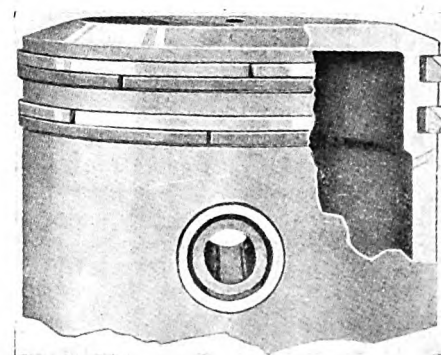
Fourteen motor-driven centrifugal pumps will be installed having a total capacity of 20,000 tons of water per hour. A maximum of 80,000 tons of water will need to be ejected requiring 4 hours' time. Shore stations will supply the electricity to operate the pumps and other machinery.

One of the special features of the dock is the installation of 4 mechanical shores. By means of these shores a vessel entering the dock can be quickly centered over the keel blocks.

Another special feature is the arrangement that has been made to control the level of the dock while she is being pumped out. Each of the fourteen pumps will be placed in a separate watertight compartment and so, if the dock starts

Kendell Piston Rings

KENDELL piston rings which have recently been placed on the marine market by the Kendell Engineering Corporation, Fort Wayne, Ind., are of two-piece construction, an inner or expansion ring and an outer or packing



Two-Piece Piston Ring

ring. A special analysis iron is used, which after having been thoroughly seasoned is further improved by a special returning process on the expansion ring, producing what is termed an "even-radius" type ring, having equatorial expansion every 30 degrees on the

entire circle, all points having equal pressure. This is especially beneficial in slightly out-of-round cylinders. A non-clogging oil wiper is also provided in this section of the ring. The outer or packing section of the ring is of softer non-resilient iron, being turned with an inner surface on a 55-degree angle, the expansion ring having an externally inclined face of the same angularity, thereby relieving groove pressure and increasing pressure on the circumference, lengthening the life of the expansion ring. This has also proven to be a non-carboning feature.

Relative Economy of Steam and Motor Vessels

Comparison of 10,000-Ton Steamship and Motorship for Voyages of 5,000 and 10,000 Miles

By Lawrence B. Chapman*

COMPARISONS of the steamship and motorship have been published from time to time but in nearly all cases the writers have attempted to prove the superiority of one type. Consequently the assumptions made and the figures used have always been favorable to one type and as a result the whole comparison has been biased and the conclusions reached untrue. Too often the comparison is made wholly on fuel costs and no allowance made for difference in cargo deadweight. In the following comparison the writer has no desire to prove the superiority of either type, his purpose being only to learn the truth regarding the motorship. Great care has been exercised in collecting the data, to make it as accurate as possible, and while certain assumptions have been made for the hypothetical case these favor neither type. As far as possible all data used have been obtained by sound scientific calculations.

MAIN PARTICULARS OF THE SHIPS

The ships chosen for the comparison are of exactly the same dimensions, namely:

Length between perpendiculars.....	420 feet
Beam	60 feet
Depth	35 feet 6 inches
Draft	26 feet

The block coefficient used is 0.78, giving each ship a load displacement of 14,600 tons. The sea speed is $11\frac{1}{2}$ knots and the net tonnage 4,750 tons. The steamship is fitted with a geared turbine, watertube boilers and uses fuel oil; the motorship is fitted with 2 four cycle engines.

The data for the ships are given in Table I, which has been taken with slight modification from the writer's book, "The Marine Power Plant."

The effective horsepower was carefully figured from Robertson's data and increased 10 percent for margin. In the motorship, which is twin screw, the effective horsepower was increased by 40 horsepower to allow for struts. The propeller revolutions per minute have been taken as 90 for the single screw geared turbine ship and 115 for the twin screw Diesel ship. These values represent present day practice. The propeller efficiencies were obtained from Taylor's charts using the revolutions per minute mentioned and wake values of 0.31 for the single screw ship and 0.23 for the twin screw ship. The propulsive coefficients were obtained by multiplying the propeller efficiency by the hull efficiency; the latter being 1.05 in the case of the steamship and 1.00 for the motorship.

The values used for steam pressure, superheat, vacuum and feed temperatures are given in the table. The steam per horsepower per hour is:

$$w_a = \frac{2545}{H_1 - H_2} \times \frac{1}{\text{efficiency ratio}}$$
$$= \frac{2545}{388 \times .63} = 10.40 \text{ pounds per shaft horsepower per hour}$$

Allowing 25 percent for auxiliaries, the total hourly steam consumption becomes 38,800 pounds. This allowance for auxiliaries assumes that the make-up feed is obtained by using an evaporator, hence only a small amount (2 percent) of feed water is carried.

FUEL CONSUMPTION

In order to obtain the fuel oil consumption of the steamship, a boiler efficiency of 90 percent of that obtained on tests was used to give the theoretical trial value. The theoretical trial fuel consumption for the motorship was taken as 0.42 pound per hour, which is the commonly accepted rate. As shown in Table II these theoretical trial fuel consumptions were increased 10 percent for the steamship and 5 percent for the motorship in order to get fuel consumption in service. While these percentage increases over trial conditions may be rather small for average service at sea, moderate increases over those used will affect the comparison very little, provided the percentage increase for the motorship is allowed as about half that of the steamship.

The weights given in the table were obtained from detailed calculations, the weights of the prime movers being obtained from the manufacturer in each case. The lengths of the machinery spaces are from detail layouts of main engines and all auxiliaries. The gross tonnage for each ship was the same, as the total double bottom was considered available for fuel oil. The machinery spaces in each case came above 13 percent; hence the net tonnage is the same for both ships. The weights and costs of machinery are for total machinery and include main and auxiliary generating sets.

TABLE I

	Steamship	Motorship
1. Model effective horsepower + 10 percent..	1,720	1,760
2. Number of screws (3 bladed).....	1	2
3. Propeller revolutions per minute.....	90	115
4. Propeller efficiency	0.550	0.605
5. Propulsive coefficient	0.577	0.605
6. Shaft horsepower	2,980	2,910
7. Boiler pressure (gage)	250	.....
8. Superheat (degrees F.)	100	.....
9. Vacuum (inches, mercury)	$28\frac{1}{2}$	.....
10. $H_1 - q_2$ (feed = 218 degrees)	1,079	.....
11. $H_1 - H_2$	388	.....
12. Efficiency ratio	0.63	.....
13. Steam used by main engines (pounds per shaft horsepower per hour)	10.40	.....
14. Auxiliary steam (percent of main engine) ..	25 percent	.....
15. Total steam per hour	38,800	.....
16. Boiler efficiency in service	72 percent	.....
17. Rate of combustion (pounds per square foot heating surface per hour)	.55	.....
18. Fuel per shaft horsepower per hour (trial condition)	1.03	0.42
19. Total fuel per hour (no reserve)	3,080	1,220
20. Length of engine and boiler rooms (feet) ..	50	55
21. Total weight of machinery and boilers (wet), tons	400	755
22. Weight of machinery (pounds per shaft horsepower per hour)	300	580
23. Feed water for 5,000 miles (2 percent carried), tons	150	.....
24. Consumable stores, crew and effects, (5,000 miles), tons	50	50
25. Calculated fuel for 5,000 miles + 20 percent reserve, tons	750	300
26. Calculated fuel for 10,000 miles + 20 percent reserve, tons	1,500	600

WEIGHT

The weight of the hull and equipment for both ships is 4,200 tons. Table I gives the weights of the machinery. The gross deadweights thus become:

*Professor of Naval Architecture, Lehigh University, Bethlehem, Pa.

TABLE II.—ANNUAL OPERATING EXPENSES (Based on a cargo of 0.75 percent deadweight capacity)

	Steamship 5,000 Miles	Motorship 10,000 Miles	Steamship 10,000 Miles	Motorship 10,000 Miles
1. Gross deadweight	10,000	9,645	10,000	9,645
2. Cargo deadweight (item 1—fuel, stores and water)....	9,050	9,295	8,100	8,945
3. Sea speed (knots)	11½	11½	11½	11½
4. Net tonnage	4,750	4,750	4,750	4,750
5. Service fuel per shaft horsepower per hour.....	1.03 + 10 percent	.42 + 5 percent	1.03 + 10 percent	.42 + 5 percent
6. Days overhauling and lost per year	30	30	30	30
7. Rate of stevedoring (tons per hatch per hour).....	30	30	30	30
8. Rate of stevedoring (tons per 10 hour day).....	1,500	1,500	1,500	1,500
9. Days on run + 5 percent	19	19	38	38
10. Days in port + 10 percent	10	10.2	8.9	9.85
11. Days per single trip	29	29.2	46.9	47.85
12. Single trips per year	11.53	11.3	7.15	7.00
13. Initial cost of hull and equipment	\$700,000	\$720,000*	\$700,000	\$720,000*
14. Initial cost of machinery	300,000	480,000	300,000	480,000
15. Initial cost of ship complete	1,000,000	1,200,000	1,000,000	1,200,000
16. Tons carried per year at 75 percent deadweight capacity	78,300	78,800	43,500	47,000
Annual Expenses				
17. Depreciation (5 percent)	\$50,000	\$60,000	\$50,000	60,000
18. Insurance on hull and machinery (5 percent).....	50,000	60,000	50,000	60,000
19. Repairs, maintenance and overhauling (5 percent)....	50,000	60,000	50,000	60,000
20. Profit 10 percent on investment (10 percent).....	100,000	120,000	100,000	120,000
21. Total capital charges (25 percent)	\$250,000	\$300,000	\$250,000	\$300,000
22. Fuel used at sea and in port	87,000	41,750	102,500	50,800
23. Lubricating oil and fresh water	3,000	3,820	6,000	7,640
24. Wages of crew	37,500	37,500	37,500	37,500
25. Subsistence of crew (70 cents per man per day).....	8,500	8,500	8,500	8,500
26. Tonnage dues and port charges	34,500	33,500	20,500	20,700
27. Brokerage and management at 50 cents per ton.....	39,000	39,400	22,750	23,500
28. Stevedoring of cargo at 70 cents per ton	110,000	110,500	61,000	65,800
29. Annual operating expenses (sum 17 to 28).....	\$569,500	\$575,000	\$508,750	\$514,440
30. Rate per ton cargo to give 10 percent return on investment	7.28	7.30	11.70	10.90

* \$20,000 additional cost added because of electric deck machinery.

Gross deadweight of steamship=14,600—(4200+400)=10,000 tons.
Gross deadweight of motorship=14,600—(4200+755)=9,645 tons.

The net cargo deadweights are given in Table II.

Table II gives the summary of annual operating expenses and freight rates to give a profit of 10 percent on the investment for steamship and motorship for voyages of 5,000 and 10,000 miles. This table is based on an average cargo equal to 75 percent of the deadweight capacity in each case. While profit is in reality not an operating expense and most accountants today do not include interest on investment as an operating expense, it was thought best to arrange the work in this way in order to give the comparison on freight rates.

The calculated time at sea has been increased 5 percent to allow for bad weather and the calculated time in port for cargo handling has been increased 10 percent over that required to discharge and receive the cargo, to allow for tides, holidays and general delay. Thirty days per year have been allowed for docking, overhauling, painting, etc.

Table III gives the cost of crew together with their monthly wages. The wages have been kept the same for both ships. As a matter of fact, however, those for the motorship would be slightly higher as there would be two motormen per watch or one motorman and one electrician instead of one oiler and one fireman.

Fuel oil for the steamship has been assumed at \$1.50 a barrel and 8 pounds per gallon; Diesel oil has been assumed at 4½ cents per gallon (\$1.88 per barrel) and 7.35 pounds per gallon. Port fuel for heating, lighting and operating the winches has been taken as 7 tons per day for the steamship and one ton for the motorship.

TABLE III.—Crew's Monthly Wages (United States Shipping Board Scale, effective April, 1922).

Master	\$300
First Officer	165
Second Officer	145

Third Officer	130
Carpenter	65
Able seaman (7) at \$55	385
Ordinary seaman (3) at \$40	120
Radio operators (2) at \$90	180

Deck department (17)	\$1,490
Chief engineer	\$240
First assistant	165
Second assistant	145
Third assistant	130
Deck engineer	70
Oilers (3)	195
Firemen or motormen (3) at \$57½	172.50
Wipers (3) at \$50	150

Engine department (14)	\$1,267.50
Steward	\$105
Cook	90
Second cook	70
Mess boys (3)	105

Steward's department (6)	\$370
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Total per year = \$37,500.
(\$3,127.50 per month.)

CALCULATIONS FOR STEAMSHIP

Calculations for the steamship on the 5,000 mile voyage follow:

- Rate of stevedoring at 30 tons per hatch per hour =
 $30 \times 5 \text{ hatches} \times 10 \text{ hours} = 1,500 \text{ tons per day.}$
- Days on run = $\frac{5000}{11.5 \times 24} \times 1.05 = 19 \text{ days.}$
- Days in port = $\frac{9050 \text{ tons} \times 2 \times 0.75}{1500} \times 1.10 = 10 \text{ days}$
- Single trips per year = $\frac{365 - 30}{10 + 19} = 11.53 \text{ trips.}$

16. Tons carried per year = $9050 \times 11.53 \times 75$ percent = 78,300 tons.
22. Fuel used at sea = $\frac{2980 \times 1.03 \times 19 \times 24}{2240} \times 1.10 = 688$ tons.
- Fuel used in port = $10 \times 7 = 70$
Total fuel per single trip, 758 tons
Cost of fuel per year = $758 \times 11.53 \times \$9.95 = \$87,000$
23. Lubricating oil, at 1 gallon per 10,000 shaft horsepower hours,
 $\frac{2980 \times 19 \times 24 \times 11.53}{10,000} = 1,570$ gallons per year.
- Cost of lubricating oil per year at 75 cents a gallon
= $1570 \times 0.75 = \$1,175$.
- Cost of feed water = $150 \times 11.53 \times \$1.00 = \$1,725$.
(Lubricating oil for the motorship was allowed for as 1 gallon per 3,000 shaft horsepower hours.)
26. Port charges:
- | | |
|------------------------------------|---------------|
| Pilotage (inward and outward)..... | \$273 |
| Towage (inward and outward)..... | 200 |
| Miscellaneous fees | 100 |
| Cooperage and dunnage | 300 |
| Clerks, watchmen, etc. | 200 |
| | <hr/> \$1,073 |

- Dockage at 2 cents per ton per day = $4,750 \times 11.53 \times 10 \times .02 = \$11,000$
- Tonnage dues at (6 cents and 34 cents) $\times 4,750 \times 11.53 \times .20 = 11,000$
- Miscellaneous, (as above) = $1,073 \times 11.53 = 12,500$
- Port charges per year = \$34,500
28. Stevedoring of cargo = 78,300 tons $\times 2 \times \$70 = \$110,000$

CONCLUSION

The foregoing calculations which have been carried through in an impartial manner show that the steamship can carry cargo on the 5,000 mile voyage at \$7.28 per ton against \$7.30 per ton for the motorship. Thus there is a gain of 2 cents per ton in favor of the steamship.

A study of the main groups of operating expenses will clearly show why the motorship is at a disadvantage. All the groups are practically identical except group 21 (capital charges) and group 22 (fuel oil). While the motorship uses only 40 percent of the fuel that the steamship uses, the cost per gallon today is about 25 percent higher.

MOTORSHIP GAINS ON THE LONG VOYAGE

On the 10,000 mile voyage the motorship shows up decidedly superior to the steamship. For voyages greater than 10,000 miles there is no doubt that the motorship would prove its superiority over the steamship.

The foregoing comparison shows that the motorship is at a disadvantage because of the higher first cost. Twenty-five percent of this original cost appears in the annual operating expenses as capital charges (item 21). The capital charges for the motorship for both the 5,000 and 10,000 mile voyages are \$50,000 a year higher than the steamship, while the fuel costs for the motorship per year are only \$45,000 and \$50,000 less.

It would appear from the foregoing calculations that there is no gain in adopting the motorship for voyages less than 6,000 or 7,000 miles, unless the first cost of the Diesel engine can be reduced. This first cost will no doubt be reduced somewhat in the future due to standardization and increased experience. However, it hardly seems probable that the motorship will replace the steamship to any large extent until a cheaper design of Diesel engine is produced. The real solution in the opinion of the writer is the adoption of the two cycle engine. This will reduce the weight and consequently the cost of the engine, allowing the motorship to carry considerable more cargo than the steamship. This additional cargo together with cheaper fuel bill and lower capital charges will place the motorship ahead of the steamship even on short voyages.

If added experience allows the Diesel engine to use boiler fuel oil instead of the lighter Diesel oils, the operating costs of the motorship will be further reduced.

The machinery layouts clearly show that the Diesel machinery occupies slightly more space than the steam machinery although the general impression is that the motorship is superior to the steamship in this regard. With the adoption of the two cycle engine a considerable gain in cargo space will result.

Statements have often been made that the motorship carries more cargo per annum than the steamship but a study of Table II shows that for a 5,000 mile voyage the cargo carried per year is practically the same for the two types. This of course is due to the fact that the increased weight of the Diesel machinery (see items 21 and 22, Table I) more than offsets the reduction in fuel weight. On the 10,000 mile voyage the cargo carried by the motorship is considerably in excess of the steamship due to the lower fuel weight.

Table IV shows the operating expense groups arranged as percentages of the total annual operating expenses.

TABLE IV.—OPERATING EXPENSES

Operating Expenses	5,000 mile voyage		10,000 mile voyage	
	Steam-ship	Motor-ship	Steam-ship	Motor-ship
1. Capital charges (including profit)	44%	52%	49%	58½%
2. Fuel, lubricating oil and water	16	8	21½	11
3. Crew and subsistence.....	8	8	9	9
4. Brokerage and management	7	7	4½	4½
5. Port charges	6	6	4	4
6. Stevedoring of cargo	19	19	12	13
	100%	100%	100%	100%

Table IV clearly shows the relative importance of the items making up the operating expenses. Compared to capital charges and stevedoring, the fuel costs are relatively unimportant. It is seen that the Diesel engine loses out on the short voyage because of the large increase in group 1. This table is very significant in that it shows that the successful ship of the immediate future is not one in which fuel or crew wages are reduced so much as the one with the lower first cost and lower stevedoring charges. These last two items make up roughly 70 percent of the entire operating expenses—surely a field for searching investigation.

It is interesting to note in Table II that the annual operating expenses are less on the longer voyage than on the shorter voyage. This is due to the greater saving in cargo handling, which is practically cut in half on the longer voyage. The capital charges and fuel costs remain practically the same for both voyages. The Diesel wins out on the longer voyage because of the larger cargo carried, due to the reduced fuel and feed water weight and not because of the saving in fuel costs.

The figures and data used in the above comparison are for a hypothetical ship of 10,000 tons deadweight and of course do not apply to all cases. The figures do, however, represent general practice and small changes in any of the items will not affect the broad conclusion, namely, that a 10,000 ton motorship shows no gain over the steamship fitted with the most up-to-date power plant, for voyages under 6,000 miles. Changes in the size and speed of the ship will, of course, influence the result.

It may be that the repairs and maintenance charges for the motorship may eventually turn out to be lower than those of the steamship but until actual figures are available covering a period of years we are not warranted in favoring the motorship in the comparison.

EFFECT OF MODIFICATIONS IN THE DATA

If actual costs are available for Diesel machinery and fuel that differ from those used in the above comparison, modifications may be readily made in the table to get a com-

parison. Thus, for instance, if two cycle engines are available at a cost for total installations of \$380,000 and with a total machinery weight of 450 pounds per shaft horsepower the following changes will result:

Total cost of ship, \$720,000 + 380,000 =	\$1,100,000
Approximate increase in fuel and lubricating oil per year	\$4,000
Saving in capital charges per year	\$25,000
Saving in machinery weight	170 tons
Increase in cargo carried per year	
$170 \times 11.53 \times .75 =$	1,500 tons
Total cargo carried per year	80,300 tons
Annual operating expenses (\$575,000 - \$21,000)	\$554,000
Rate per ton $\frac{\$554,000}{80,300} =$	\$6.90

For the above conditions the motorship would be superior to the steamship on the 5,000 mile voyage.

If Diesel fuel can be purchased at a rate less than one and a quarter that of boiler fuel, the motorship and steamship will be nearly equal on the 5,000 mile voyage.

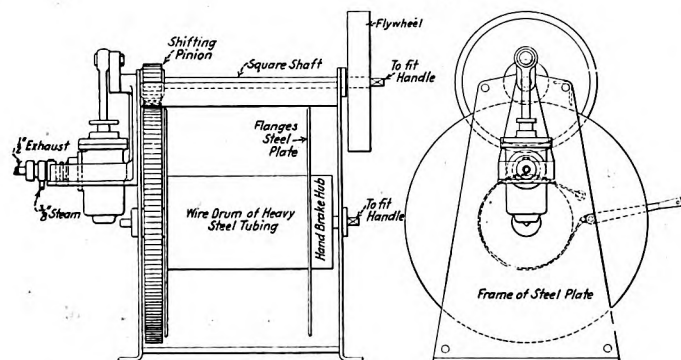
Further, if Scotch boilers are used in place of water-tube boilers, the cost of the steamship will be slightly greater and the cargo carried per year about 900 tons less. This will be to the advantage of the motorship in the comparison.

Developments in the future, such as standardization, the adoption of the two cycle engine and the use of poorer grades of fuel in the Diesel engine, will reduce the length of voyage at which the steamship and motorship show the same annual operating costs. On the other hand, the adoption of Diesel machinery is bound to force those interested in steam machinery to improve the economy and efficiency of the steam plant, so that any gain to the advantage of the motorship is likely to be met by gains to the advantage of the steamship. In general, for ships of about 10,000 tons deadweight, the motorship will probably be largely adopted for voyages over 5,000 miles and for powers under 10,000 shaft horsepower, and the steamship for all voyages of 5,000 miles and less and for the fast and high powered ships.

It should be clearly borne in mind that the above comparison is for a 10,000 ton cargo ship on a given length of voyage at a speed of $11\frac{1}{2}$ knots and the conclusions arrived at are for a specific case only.

New Steam Operated Reel for Use With Snubbing Wire on Canal Steamers

IN response to a demand for a steam operated reel for use with snubbing wire on canal steamers, the Montreal Drydocks and Ship Repairing Company, Ltd., Montreal, Can., has designed and successfully tried out the "Little Snubber" with engine attached, which is shown in the illustration. The reel is safe to operate and is not overpowered, being designed for operating from 40 to 180 pounds steam to



"Little Snubber" Steam Operated Reel

pull in the slack snubbing wire only. The reel can be operated by hand in single or double gear, if desired, without any change, and cable paid out on the brake.

A compact design of engine has been evolved which is easily overhauled and repaired, has large bearing surfaces and stows neatly away without taking up any more deck space than the ordinary hand reel. The whole outfit is relatively inexpensive and, if desired, the engine alone can be furnished for connecting to hand reels at little expense.

The gears are the only parts not of steel, and all shafts are square so that new gears can be slipped on as they come from the foundry and with no labor whatever in boring, keyseating, fitting, etc.

Concentration Salinity Indicator

THE newest development along the lines of the instantaneous determination of the chlorine content in a ship's water system has taken the form of a signal light controller. This apparatus, known as the Concentration Salinity Indicator, which is handled by The Babcock & Wilcox Company, New York, indicates automatically and instantaneously an increase in the density by showing various colored lights, a white light for 0.5 grain, a green light for 0.5 to 5 grains and a red light for a density over 5 grains. This is an especially valuable feature in connection with the evaporator room, as an instantaneous warning is given when the quality of the distillate changes, thus obviating the possibility of running considerable poor water.

The signal light controller also keeps a most accurate check on the condenser, which is an important feature for merchant vessels. A continuous indication of the quality of the condensate is shown at all times, the warning lights showing as in the case of the evaporator, but with a slightly different range. The white light shows a density up to 0.3 grain, the green light shows from 0.3 up to 1 grain, and the red light shows above 1 grain.

As a result of tests made on the United States battleship *Tennessee* for over a year under actual operating conditions,

the Concentration Salinity Indicator was installed on the battleships *Maryland* and *Nevada*, and subsequent to these installations the United States Navy has ordered complete sets for battleships, cruisers, scout cruisers and supply ships.

Indicators are also being installed on the S.S. *Leviathan* and on three New York City ferry boats.

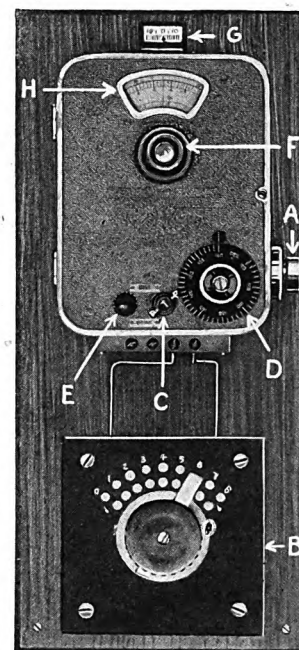


Fig. 1.—Concentration Indicator and Selector Switch

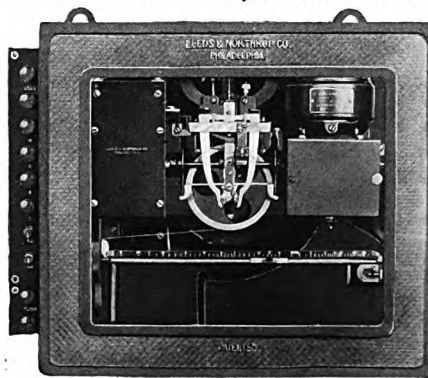
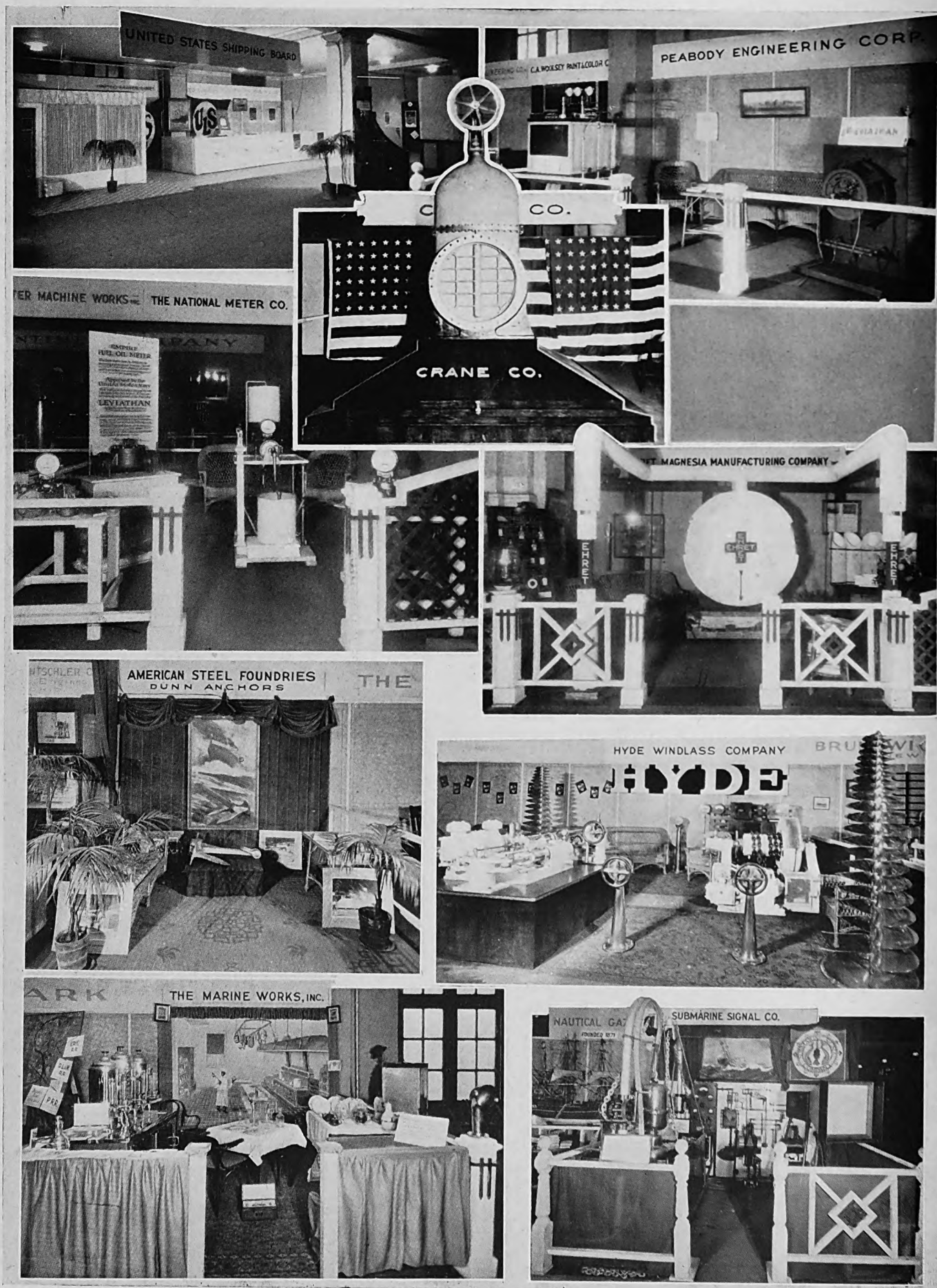


Fig. 2.—Signal Light Controller



Additional Views of Exhibits at the Marine Exposition, Grand Central Palace, New York, November 4-11, 1922

Ropes, Chains and Blocks for Shipbuilding Purposes—II

By Horace Holden Thayer*

Continuation of a series of articles containing information regarding shipbuilding materials and their uses that is not readily obtainable from shipbuilding handbooks and other generally available sources. The articles are not intended to be a complete exposition of the subject but will be found to contain items of value to the various classes of workers in this field who have to deal with these materials from the materials' point of view.

Davit guys and spans are preferably of wire rope, about $\frac{5}{8}$ -inch diameter. As no great flexibility is required, a 6 by 7 construction will suffice.

Lifeboat operating gear of vessels under the jurisdiction of the United States Steamboat Inspection Service has to meet with their approval.

DAVITS

Boat davit falls should be as flexible as possible. Where wire rope is used, this means the type of rope that will have maximum strength with minimum diameter and also a rope made up of fine individual wires. For ropes smaller than $\frac{1}{2}$ -inch a galvanized plow steel rope, of 8 by 19 construction, with ultimate strength about 90 percent of that given in Table IV, and of the diameter necessary to take care of the weight with a factor of safety of at least 5, is good practice. For ropes larger than $\frac{7}{16}$ -inch the 6 by 37 construction is desirable. Where the weights are moderate manila rope will answer.

Special shackles are required for boat davit blocks to take care of the connections at the davits and at the boats, with ample spread of jaw and ample distance between the base of the jaw and the center line of the pin. A swivel jaw shackle is desirable for the upper blocks and a regular jaw shackle for the lower blocks. Eight-inch double blocks are a good size for 3-inch circumference manila falls and 7-inch for $2\frac{1}{4}$ -inch circumference falls. Brass roller bushings are desirable.

EQUIPMENT

Anchor cables, stream lines, mooring lines and towlines, together with the anchors, form the so-called equipment of a vessel. Where a vessel is classed, all important particulars of the equipment are definitely specified by the classification society concerned and the cables are regularly tested by them. The equipment of such vessels has to be ordered in accordance with their requirements as to length, size, etc., and those who furnish it should be advised that it has to meet classification society approval.

The classification societies may be expected to approve for schooner barges and other craft that do not exactly come under their rules for steam or sailing vessels equipment that is in line with good practice even though it is not up to the standard determined by a strict application of their rules.

A good equipment is very important for the safety of the ship and all on board of her; and even where a vessel is not classed, classification society requirements should receive careful consideration in the selection of that equipment.

Wire rope equipment lines should be specified to be delivered on individual reels for each length, the reel being marked with the number of strands and wires per strand, the size of rope, the length of rope and the name of the manufacturer. All unworked ends of the ropes should have three servings or wrapping tightly applied.

The stream line should be of galvanized steel wire rope, preferably having 6 strands around a hemp center, with a hemp center and 24 wires to each strand. This may be

designated as the 6 by 24 construction with 7 hemp centers. It should have a galvanized hawser thimble spliced in one end. The strength should be in accordance with Table I.

The towline may be of wire rope or fiber rope. If the former on steamships and sailing vessels, it is preferably of the same nature as the above mentioned stream line, but with a galvanized hawser, thimble spliced in one end and a long spliced eye or loop in the other.

Wire rope towlines for seagoing barges are generally used in conjunction with towing engines and should have greater strength for their size than the 7 hemp center ropes so as to take up less space on the drums. For this service galvanized steel towing hawsers of 6 by 37 construction with one hemp center are preferable. A customary size is $1\frac{1}{4}$ -inch diameter and this size should have an ultimate strength of 108,000 pounds. It is desirable that such hawsers have a heart shaped cringle rove in the outboard end. They should be served back for 5 feet with galvanized annealed steel seizing wire. These lines are a part of the tugboat equipment. Fiber rope towlines for barges, which form a part of the barge equipment, are preferably of the strongest and highest grade manila because when a barge breaks adrift from its tow it is largely at the mercy of the elements. Bolt rope is therefore the rope to use. A 9-inch manila bolt rope towline should have a strength in excess of 65,000 pounds.

"Durable" wire rope towlines are of the 5 by 19 construction.

Wire rope hawsers, mooring lines and warps are preferably of the same construction as specified for stream lines, but having a long spliced eye or loop in one end. "Durable" wire rope hawsers are usually of the cable laid construction made up of five 5 by 7 ropes.

Chains should be in accordance with classification society requirements as to size, strength, size of links, etc. They should be coated with an approved protective covering. Anchor chain cables should be ordered complete with connecting and anchor shackles; and to insure that all connecting shackles will lead the same way over the windlass wildcat there should be an odd number of links in each length of chain. It is very important that the chain links and the wildcats match up. It is advisable to order with every suit of two anchor chains for ocean going vessels two spare anchor shackles and two spare connecting shackles complete and also two spare anchor shackle pins and four spare connecting shackle pins. All keeper pins in shackle pins should be of brass so that they may be readily renewed.

GANTLINES

Manila rope $1\frac{1}{2}$ -inch circumference will answer for this, with 6-inch single wood block with shackle to suit the connection and graphite bronze bushing.

HEAVING LINES

Ratline is used for this service.

LADDERS

Wire rope for ladders should be medium flexible and is preferably of 6 by 12 construction. Fiber ropes can be as specified under manropes.

*Member of the firm of Russell & Thayer, naval architects and marine engineers, Philadelphia, Pa.

LANYARDS

The usual rope for this service is 4-strand tarred hemp rope.

LASHINGS

Lashings for spare propellers, anchors, etc., of considerable weight are preferably of flexible wire rope.

Fiber rope lashings for boats, small anchors, etc., and for general use about the vessel are preferably ratline.

Chains are used in some cases but are subject to excessive corrosion.

LEAD LINES

Lead lines are generally of cotton braided around a cotton center. They are smooth, flexible and have a polished surface. They are designated by a number which indicates the diameter in 32nds of an inch. The size is to suit the weight of the lead. For a 7 or 9 pound lead it may be No. 8, or 8/32-inch diameter, which runs about 44 feet to the pound and should have an average breaking strength of 300 pounds; for a 14 or 20 pound lead it may be No. 9, which runs about 36 feet to the pound and should have an average breaking strength of 400 pounds. For a 50 pound lead it may be No. 12, which runs about 20 feet to the pound and should have an average breaking strength of 700 pounds.

The Navy Department uses a braided cotton line 5/8-inch circumference for a boat's lead line, a braided flax line 1-inch circumference for a coasting lead line and a plain laid American hemp line 1 1/2-inch circumference for a deep sea lead line.

An untarred hemp line 3/4-inch circumference will answer for a hand lead line.

Hand lead lines are marked as follows, and should be well soaked before being marked:

- At 2 fathoms from the lead, with 2 strips of leather.
- At 3 fathoms from the lead, with 3 strips of leather.
- At 5 fathoms from the lead, with a white rag.
- At 7 fathoms from the lead, with a red rag.
- At 10 fathoms from the lead, with leather having a hole in it.
- At 13 fathoms from the lead, same as at 3.
- At 15 fathoms from the lead, same as at 5.
- At 17 fathoms from the lead, same as at 7.
- At 20 fathoms from the lead, with two knots.
- At 25 fathoms from the lead, with one knot.
- At 30 fathoms from the lead, with three knots.

The pieces of leather and rag as well as the pieces of cord in which the knots are to be tied for the 20, 25 and 30 fathom points should be securely attached to the line by a wrapping of waxed twine which is drawn through the cord once at the end.

The lead may be attached either by passing the line through the eye of the lead, knotting the line and securing the loose end by waxed cord, or, if the size of the eye permits, by making a long loop at the end of the line which can be threaded through the eye and passed over the end of the lead. Due allowance should be made, in securing the fathom markings, for the length of the lead and the methods of its attachment.

LIFEBOAT LINES

Lifeboats and life-rafts on all vessels under the jurisdiction of the United States Steamboat Inspection Service are required to be fitted with ropes as called for and approved by them. The painter for sea going vessel service has to be of manila rope not less than 2 3/4-inch circumference and of suitable length.

LIFE LINES

Lines for line carrying guns have to meet the approval of the United States Steamboat Inspection Service. They must be not less than 1,700 feet long and be capable of withstanding a breaking strain of 500 pounds. Life buoy lines are also subject to the same approval.

LIMBER CHAINS

Limber chains are usually 3/8-inch galvanized short link chains. A twisted link chain is preferable, and in large vessels a 7/16-inch chain is advisable.

LOG LINES

Log lines are the same as the cotton lead lines. The usual size is No. 8.

MANROPE

These are hand ropes and grab ropes of various kinds. A 6 by 19 galvanized wire rope is suitable. A good fiber rope for this service is the 4-strand tarred hemp rope, 2-inch or 2 1/4-inch circumference. It is frequently wormed, parcelled, covered with canvas and painted.

RAILINGS

Wire rope used as railings is preferably of the nature specified for awnings.

Chain used as railings in way of gangways, etc., or for portable railings around hatches can generally be 3/8-inch galvanized short link chain.

RATLINES

Ratlins are frequently made of iron; but where fiber rope is to be used this is the service for which ratline is particularly adapted.

RIGGING

The rigging on classed vessels is subject to classification society approval, and these societies have tabulated requirements for the standing rigging of sailing vessels.

The standing rigging does not require much flexibility and for sizes 1 1/2-inch diameter and less the 6 by 7 construction of wire rope is satisfactory. For greater diameters than 1 1/2-inch the 6 by 19 construction is preferable. It should be of galvanized cast steel with ultimate strength for the 6 by 7 rope as given in Table II, and for the 6 by 19 rope as given in Table III.

Wire rope running rigging should be as flexible as possible consistent with good wearing qualities. This calls for the use of the highest grade rope for such service as topping lifts, cargo hoists and davit falls, in order to keep the diameter as small as possible. The 8 by 19 plow steel rope is the most desirable and in the sizes required it should have an ultimate strength 90 percent of that given in Table IV for the 6 by 19 rope. Where it cannot be readily obtained the 6 by 19 rope of Table IV is suitable. For wireless halyards and similar service cast steel rope with an ultimate strength as given in Table V is satisfactory.

Running rigging is frequently galvanized although some of the manufacturers and users claim that the galvanizing is soon knocked off, leaving the rope in a worse condition than the ungalvanized rope. The writer is of the opinion that topping lifts should be galvanized and cargo hoists which are in frequent use not galvanized.

"Durable" wire rope for running rigging is of the 5 by 19 construction. It requires special sheaves and blocks.

Fiber rope for cargo operating is preferably a 4-strand manila rope with a heart, hard laid, and with tallow treated yarns. A special grade of manila rope is made for the running rigging of small boats, called yacht rope. The Navy Department recommends for the rapid handling of loads of about 900 pounds, such as coaling whips, a 4 1/2-inch circumference, 4-strand manila rope.

Fiber rope standing rigging is now practically obsolete except on small boats. A 4-strand tarred hemp rope is the type mainly used for this service. Running rigging is preferably the medium lay 3-strand manila.

A usual size for sails on steamships is 3-inch circumference for the sheets and halyards and 2 1/2-inch circumference for the downhauls. On large schooner rigged sailing vessels

Table VIII—Rigging for Cargo Handling—1 to 5 Tons Capacity

Name	Wire					Manila		BLOCKS (a)						
	Diam.	Circ.	Type	Wires Per Strand	Galv. or Not Galv.	Circ.	No. of Strands	Type	Diam. of Sheave	Length of Shell	No. of Sheaves	Shackle	Becket	Location
Topmast stay	3/4"	2 3/4"	Cast steel	6	7	Galv.	...	...	...	...	...	...	...	...
Back stay	3/4"	2 3/4"	Cast steel	6	7	Galv.	...	...	...	...	...	...	...	...
Shrouds	1 1/2"	4"	Cast steel	6	7	...	...	...	...	...	...	...	...	...
Topping lift	7/8"	2 3/4"	Plow steel	8	19	Galv.	...	Steel	16"	10"	Single	Regular	Without	Masthead
Topping lift purchase...	...	...	...	...	...	...	3 1/2"	{ Wood	6 1/4"	10"	Double	Upset	With	Upper
Cargo hoist, single whip.	5/8"	2"	Plow steel	8	19	Not galv.	...	{ Wood	6 1/4"	10"	Triple	Upset	Without	Lower
Cargo hoist, with purchase	5/8"	2"	Plow steel	8	19	Not galv.	...	{ Steel	14"	...	Single	Regular	Without	Upper
Vang pendant	5/8"	2"	Cast steel	6	7	Galv.	...	{ Steel	14"	...	Single	Regular	With (a)	Lead
Vang purchase	...	...	...	...	...	...	3"	{ Steel	14"	...	Double	Regular	Without	Upper
								{ Steel	14"	...	Single	Regular	With (a)	Lower
								{ Wood	6 1/4"	10"	Double	Upset	Without	Upper
								{ Wood	6 1/4"	10"	Single	Upset	With	Lower

Rigging for Cargo Handling—30 Tons Capacity

Topmast stay	3/4"	2 3/4"	Cast steel	6	7	Galv.	...	...	...	...	...	...	...	...
Back stay	3/4"	2 3/4"	Cast steel	6	7	Galv.	...	...	...	...	...	...	...	...
Head stay	1 1/2"	4"	Plow steel	6	7	Galv.	...	...	...	...	...	...	...	...
Preventor stay	1 3/8"	4 1/4"	Plow steel	6	7	Galv.	...	...	...	...	...	...	...	...
Shrouds	1 3/8"	4 1/4"	Plow steel	6	7	Galv.	...	...	...	...	...	...	...	...
Topping lift	3/4"	2 3/4"	Plow steel	8	19	Galv.	...	{ Steel	18"	...	Triple	Regular	With	Masthead
								{ Steel	18"	...	Regular	Without	Boom	
								{ Steel	18"	...	Single	Regular	Without	Masthead
								{ Steel	18"	...	Single	Regular	With (a)	Deck
								{ Steel	18"	...	Triple	Regular	With	Upper purchase
Cargo hoist	3/4"	2 3/4"	Plow steel	8	19	Galv.	...	{ Steel	18"	(b)	Quad.	Regular	Without	Lower purchase
								{ Steel	18"	...	Single	Regular	Without	Masthead
								{ Steel	18"	...	Single	Regular	With	Deck
Vang pendant	7/8"	2 3/4"	Cast steel	6	7	Galv.	...	...	...	...	...	...	...	...
Vang purchase	...	...	...	...	...	...	3 1/2"	{ Wood	8"	12"	Triple	Upset	Without	Upper
								{ Wood	8"	12"	Double	Upset	With	Lower

(a) The becket is for a lashing.

(b) There is an additional 18 inch sheave in the end of the boom between the lower purchase block and the masthead block.

3 1/2-inch sheets, 3-inch halyards and 2 3/4-inch downhauls will usually answer for the jibs, and 4 1/2-inch sheets, 4-inch halyards and 3 1/2-inch downhauls for the principal sails.

When dealing with topping lifts it is well to bear in mind that they usually have to be handled over the gypsy head of the winch and also fastened around relatively small cleats. Wire rope is not so convenient to handle in such circumstances as fiber rope and the best arrangement is to have wire rope from the end of the boom to beyond the masthead block with a manila rope purchase from there on. There must be sufficient length of wire rope so that the end connection does not foul the masthead block when the boom is in its lowest position, and the lower block of the manila purchase has to be sufficiently low down to permit of the boom's being brought to the highest desired angle before the purchase blocks come block to block. Complete manila topping lifts are subject to undesirable stretch.

It has been customary with a number of the east coast naval architects and shipbuilders to use 1/2-inch plow steel rope for cargo whips on the ordinary run of freighters. This is flexible and therefore easy to handle and amply strong for the usual service. In many cases, however, stevedores on the west coast have refused to unload vessels thus equipped, demanding 5/8-inch hoisting ropes. The writer knows of one vessel in particular which met with this demand and not being able to obtain the 5/8-inch rope was obliged to fit out with a set of 3/4-inch cargo hoists before the cargo could be discharged. This is a point to be borne in mind in cases where the 1/2-inch rope appears to meet the requirements of the service.

Vang pendants should be about two-thirds the length of the boom.

Chain in rigging is met with principally in parts of the running rigging and the bowsprit shrouds of sailing vessels, and for the Burton sling method of cargo handling and cargo slings generally. The former are determined by classification society requirements, and the "Coil" grade of chain is frequently used. The latter are referred to under the head of slings. Chains are also used as topping lifts where booms attached to king posts or ventilators are not raised or lowered when in operation. In some cases a section of chain is attached to the end of the topping lift, with long links that

can be conveniently hooked over some anchorage, to hold the boom in the desired position.

Blocks are an item of considerable interest in connection with the rigging. The bushings should in all cases be of a good quality, such as self-lubricating graphite bronze. Cargo hoist blocks are preferably Metaline bushed. Where ropes passing over the blocks have a considerable change of direction in the course of their operation, care should be taken to select blocks that will permit this without fouling distance pieces or other parts of the blocks.

Table VIII gives in a concise manner data for the rigging of cargo masts and booms, representative of good practice, showing the approved materials and sizes, the relations between ropes and blocks, and other information. The 1 to 5 ton layout covers a pole mast with two shrouds port and starboard; and the topping lift is a one part wire rope with a manila purchase as before explained. The 30 ton layout covers a pole mast with one preventer stay, port and starboard, and three shrouds, port and starboard.

SEIZING

This, as its name implies, is a fastening and generally means the fastening together of parts of larger ropes such as anchor lashings, boat gipes, etc. The seizing rope before described is used for this. Tarred marline is also used for small seizing.

SERVING

The process of covering a rope with a smaller rope tightly wound around it is called serving. The rope is first generally wormed and then parcelled as later explained.

Tarred marline, houseline, roundline, hambroline and spun yarn are used for this. The last mentioned is preferable as it lies smooth under the serving mallet and makes a close fitting watertight covering. Ratline is used for heavy serving.

SIGNAL HALYARDS

Manila rope 1 1/8-inch circumference is frequently used for these on steamships, with 4-inch single wood blocks with regular shackles and graphite bronze bushings. Untarred hemp rope will answer, and on smaller vessels may be 1-inch or 3/4-inch circumference.

SLINGS

Wire rope slings of various kinds are preferably of the 6 by 37 construction. For cargo handling they are usually of 1-inch wire 30 feet long with a thimble in each end. Boat slings and slings of small diameter rope can be of the 8 by 19 construction.

Fiber rope slings are preferably of three strand common lay manila.

Chain slings are of galvanized short link chain. As made up for Burton slings for cargo handling they are preferably two 10-foot lengths of the highest grade short link chain connected by a ring at one end which takes the cargo hook and with a swivel and shackle at each of the other ends. A good size is 1-inch with a 4-inch inside diameter ring, 1¼-inch swivels and 1⅝-inch shackles. Ordinary cargo slings are double and can be bought in any desired length with a ring at one end and hooks at the other. Standard lengths are 10 feet and standard sizes are 1-inch, ¾-inch and ½-inch; all of the highest grade short link chain, galvanized.

STACK GUYS

Stack guys can be of galvanized cast steel wire rope, 6 by 7 construction, with ultimate strength as given in Table II. A suitable size for stacks as met with on the ordinary run of cargo steamships is ¾-inch. They can also be of galvanized wire strand made up of 7 or 19 wires twisted together, the latter being used for the larger sizes.

Stack guys can also be of galvanized short link chain.

STEERING GEAR

Steering gear ropes require great flexibility, particularly where they are required to pass around drums or sheaves. The 6 by 37 construction of wire rope is often used, being of plow steel for transmission ropes and cast steel for tiller ropes. A special construction for this purpose consists of six small ropes around a hemp center, each rope being of the 6 by 7 construction with its own hemp center. These ropes can be obtained from ¼-inch to 1-inch diameter.

The last mentioned rope, ⅜-inch diameter, is sometimes used for steam steering engine controls but stretches too much for such service. The regular 6 by 19 cast steel rope is satisfactory for these controls.

Bronze tiller ropes are used considerably on small vessels, and also braided cotton ropes with bronze or steel wire cord centers.

Fiber ropes are preferably 4-strand or 6-strand with heart, hard laid, and with tallow treated yarns. The 6-strand rope is the more flexible and better for work on steering wheel drums of small diameter.

Chain for steering leads is mainly used around the steering engine drum and in way of the quadrant, and is preferably the highest grade of short link chain. Rapid wear takes place in way of the sheaves. Backing chains are also short link chains.

Guide sheaves should fit the ropes or chains and be of ample size.

STORES

Stores, deck outfit, etc., for the ordinary run of cargo steamships should include about

- 120 fathoms of 1⅝-inch circumference manila—3 strand.
- 120 fathoms of 1½-inch circumference manila—3 strand.
- 120 fathoms of 2-inch circumference manila—3 strand.
- 240 fathoms of 2¼-inch circumference manila—3 strand.
- 480 fathoms of 2½-inch circumference manila—3 strand.
- 480 fathoms of 3-inch circumference manila—3 strand.
- 2 coils of 9 thread manila—200 fathoms.
- 1 coil of 15 thread manila—200 fathoms.
- 20 pounds of 3-yarn spun yarn.
- 1,500 feet of plow steel wire rope of the size and construction used for cargo hoists, as spares.
- 1 chain sling 10 feet long—1-inch chain.
- 4 chain sling 10 feet long—¾-inch chain.

1 chain sling 10 feet long—½-inch chain.

2 wire slings 30 feet long—1-inch wire, with thimbles in ends.

Spare anchor shackles as mentioned under equipment.

Blocks for stores should generally include the following, together with other spare blocks and sheaves that will meet the requirements of the particular service:

Purpose	No.	Size	Type	Hook	Becket	Bushing
Lead gear	2	8-inch	wood-double	loose	with	graphite-bronze
Lead gear	2	8-inch	wood-double	loose	without	graphite-bronze
Lead gear	2	10-inch	steel-snatch	swivel	without	graphite-bronze
Lead gear	1	8-inch	wood-snatch	swivel	without	graphite-bronze
Hoisting gear..	2	16-inch	steel-double	loose	with	metalline
Hoisting gear..	2	16-inch	steel-single	loose	with	metalline
Hoisting gear..	2	14-inch	steel-double	loose	with	metalline
Hoisting gear..	2	14-inch	steel-single	loose	with	metalline
Watch tackle..	2	8-inch	wood-double	swivel	with	graphite-bronze
Watch tackle..	2	6-inch	wood-double	swivel	with	graphite-bronze
Relieving tackle	4	8-inch	wood-double	swivel	with	graphite-bronze

WIRELESS HALYARDS

Wireless halyards, if of wire rope, are frequently made ⅜-inch diameter, even where a smaller rope would answer as far as strength is concerned. They are preferably galvanized cast steel 6 by 19 construction, with ultimate strength as given in Table V.

Manila ropes should be of ample size to take the load.

Blocks for wire rope can be of small size on account of the practically permanent nature of the installation.

WORMING

Worming is the process of winding small ropes or "fittings" along the grooves between the strands of a wire or fiber rope that is to be parcelled with canvas or other cloth thereby making a more even surface for the cloth covering. Tarred marline or seizing is used for wire ropes, and marline, seizing, houseline, roundline or hambroline are used for fiber ropes. The size to use depends upon the size of the groove to be filled in.

MISCELLANEOUS

The following points are of interest in connection with a consideration of ropes:

Turnbuckles are preferably of the pipe variety where exposed to the weather so that the threads will be protected as much as possible from corrosion; although on sailing vessels where shrouds have to be disconnected so that cargo grabs will clear them, open turnbuckles are sometimes more easily handled.

Wire rope sockets have proved their worth as substitutes for thimbles and splices, and when properly applied will not pull loose even when the rope is pulled to destruction. The wires are spread apart in the form of a brush inside of the socket, which is then entirely filled with pure molten zinc. In order to guard against corrosion of the rope from water around it where it enters the socket, the rope should be wormed, parcelled and served for a length of about two feet, the parceling and serving extending on to the socket for about two-thirds of its length. The closed sockets are the most desirable for the rigging and similar work.

Lightning conductors might be considered under the head of wire ropes. They are of course of copper. A good size is the ½-inch rope composed of 34 No. 15 B.W.G. wires.

Air Gun Has Wide Range of Usefulness

JENKINS BROS., Bridgeport, Conn., manufacturers of air valves, have produced a new type air gun which has a wide application in foundries, machine shops, wood working mills and the like for cleaning chips, dust and foreign matter from work being fabricated and from molds and castings. A special feature of this gun is a renewable disk designed for air service which forms a perfect contact on the valve seat and takes up the wear of frequent usage. The gun can be used with ⅛-inch, ¼-inch, ⅜-inch and ½-inch hose pipe by the use of different size nipples.

New System Removes Oil Sludge and Dangerous Gases

H. J. Wheeler Salvage Company Perfects Nozzle Which
With Aid of Vacuum Pump Emulsifies Oil Residue

By Gunnar C. Engstrand, M.E., B.A.*

A NEW system for removing and disposing of the oil sludge or residue that accumulates in the double bottoms and tanks of oil burning vessels has been evolved and put into operation in New York harbor by the H. J. Wheeler Salvage Company of Brooklyn, N. Y. As is well known, this residue which is a thick clinging mass of almost jelly-like consistency is very unpleasant and difficult to handle.

It is heavier than oil and settles on the bottoms of the tanks. Sometimes it is heavier than water in which case, if discharged overboard, it would sink harmless to the bottom but more often it is about of the same specific gravity of water and it remains suspended in the form of chunks, threads or flakes. It is in this condition that it is particularly dangerous, for when it is washed against a solid, like piles or bulkheads, it will tenaciously cling to their surfaces which in a short time receive a tar-like inflammable coating.

It is claimed that because this oily residue has about the same specific gravity as water a satisfactory separation by centrifugal means cannot be obtained and that the mixture removed by such means is not suitable or fit to be burned under boilers. In fact it must be disposed of as a dangerous waste, as obnoxious and inflammable gases generate from and cling to the sticky surface of the residue.

ARRANGEMENT AND METHOD OF OPERATION

The arrangement of the Wheeler system is shown in Fig. 1, where a section is taken through the salvaging barge and a vessel from which oil sludge is being removed. Starting

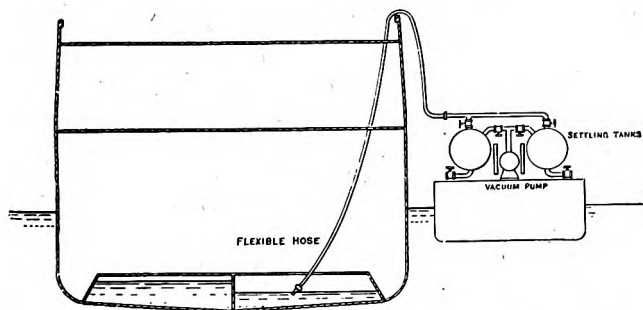


Fig. 1.—Section Through Salvaging Barge and Vessel from Which Sludge Is Being Removed

in the oil tank and attached to a flexible hose is a nozzle, the mechanical arrangement of which has not been made public. The nozzle is globular in shape, having air inlet holes spaced circumferentially around it. A tubular extension of several inches projects beneath it.

It will be noted that there are two tanks on the deck of the barge with an air pump placed between them and it will also be seen that these tanks discharge to the hold of the barge, to tanks ashore or to a tender alongside.

The system operates as follows: The intake of the nozzle is immersed in the sludge to be removed but not deep enough to submerge the air inlet holes in the globular body. Using a working vacuum of only 20 inches, air from the atmosphere is drawn through the inlets with a velocity of approximately

800 feet per second and in so doing mechanically cracks the oily residue until it is minutely subdivided and suspended in the moving air stream inside the hose. In other words, the sludge which is as heavy or heavier than water is emulsified and drawn up through the flexible hose and into one of the cylindrical tanks shown. When one of the cylindrical tanks is filled the suction is by-passed to the other tank, while the discharge from the full tank to the hold of the barge is opened and the emulsified oil blown into it. The contents of the tanks can also be discharged to receptacles on shore or to a tender alongside by means of compressed air.

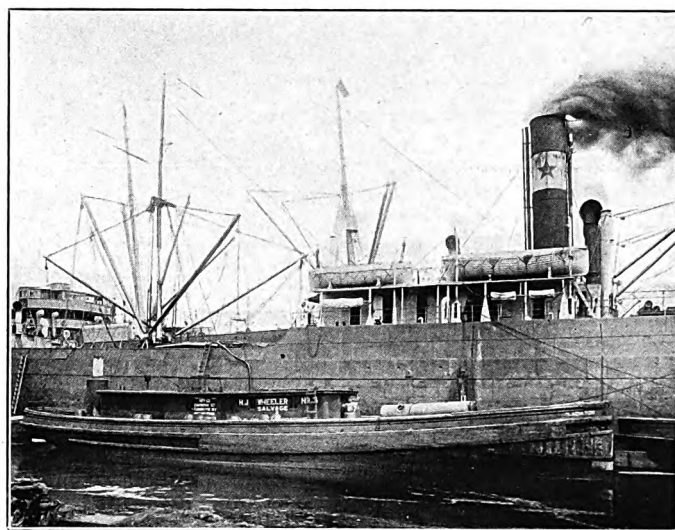


Fig. 2.—Wheeler Barge in Operation

After this emulsified product has settled in the hold of the barge the oil will flow to the surface leaving clear water underneath.

The bottom settling is clean water which is discharged overboard and the oil residue, which is now free of water, is suitable for burning under the boilers.

A very important claim for this system is that the obnoxious and dangerous gases that are generated in oil tanks are pumped out with the air and sludge. Chemists' tests have shown only a trace of .001 vapor in tanks after cleaning with the Wheeler apparatus.

Hundreds of well-performed tank cleaning jobs in the port of New York have amply proven the efficiency of this apparatus. Even "sour" oil which is an intimate and churned mixture of oil and water will separate. This separation takes about 12 hours, while the settling ordinarily is effected in 3 hours.

Fig. 2 shows one of the Wheeler barges in actual operation alongside of a ship. A striking example of the low specific gravity of the emulsified residue was shown on a recent job on the *American Legion*. One of the Wheeler barges named the *Gladiator* pumped 150 tons of oil residue from the forepeak of the *American Legion* in 44 hours against a head of 65 feet. The importance of the ability to carry a hose up over the high deck of a passenger ship and remove such a substance as oil sludge against a head of 65 feet does not need any comment.

*Chief engineer, Donnelly Dry Dock Company, Inc., New York.

Twin-Screw Oil Burning Turbine Liner *Albert Ballin*

New System of Anti-Rolling Tanks Installed—To Equal *Majestic* and *Leviathan* in Comfort and Conveniences

ACCORDING to cable advices received from the Hamburg-American Line in Hamburg, their new twin screw oil burning turbine steamship, *Albert Ballin*, was successfully launched in the yards of the Blohm and Voss Shipbuilding Company of Hamburg on December 16, 1922.

The *Albert Ballin*, named after the late Director General of the Hamburg-American Line, is the first one of two large steamers of modern type ordered by the company about two years ago for the service between Hamburg and New York

occur on account of shallow draft as in the case of the *Cap Polonio*.

ACCOMMODATIONS

Accommodations have been provided for 250 first class passengers. In the planning and equipment of the state-rooms and suites the greatest care has been exercised to make them equal in comfort and convenience to the gigantic *Imperator* and *Vaterland*, which were put in service by the Hamburg-American Line just before the war. There will be four large suites consisting of sitting room, bedroom and bath as well as wardrobe or trunk room, and a number of large staterooms with private bath. All of the other cabins will be of large size and comfortably arranged. There will be only a small number of inside rooms, and even these are so placed that they will receive light from the side ports. All rooms will be equipped with regular beds, wardrobe, dressing table, and most of them with running hot and cold water. Liberal space has been provided for the public rooms such as social hall, library, writing room, smoking room with gallery and veranda café, gymnasium and electric bath.

The main promenade deck, partially enclosed with "Lay-cock" windows, as well as the boat deck, will provide ample space for deck chairs and promenading.

The second cabin, accommodating 340 passengers in large well-ventilated 2- and 4-berth rooms, will have very commodious and well-appointed public rooms, i. e., social hall, smoking room and large dining room, the latter with a capacity for 300 persons at one sitting. Also in the second cabin the stateroom arrangement has been so planned that there will be only a few inside rooms. There will also be ample space for deck games and promenading.

Passenger elevators are provided for second cabin, as well as first. Particular attention has been given to the location,

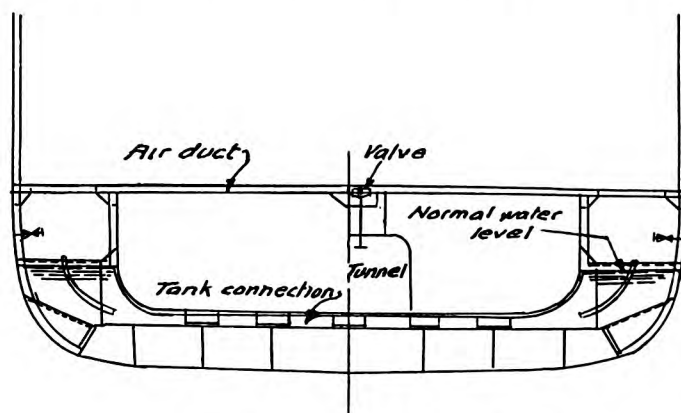


Fig. 1.—Old Type Anti-Rolling Tanks

via Southampton and Cherbourg. The sister ship *Deutschland* will be launched from the same yard in the course of 1923.

The vessel just launched is scheduled to enter the joint service maintained by the United American Lines and the Hamburg-American Line in May, 1923. The *Albert Ballin* is a vessel of 22,000 tons gross register. She is over 600 feet long overall, with a beam of 73 feet, and is provided with 7 decks for the accommodations of 250 first cabin passengers, 340 second cabin passengers and 1,100 third class passengers.

FRAHM ANTI-ROLLING TANKS

A special feature of this new ship will be a new anti-rolling tank system which is an invention of Dr. Frahm of the Blohm and Voss Shipbuilding Company. This is the first application to a steamship of the new system which is a combination of the built-in tanks ordinarily employed, see Fig. 1, and the hull bulge, see Fig. 2, which was originally tried out as an experiment in the construction of the steamship *Cap Polonio*.

The *Cap Polonio* was built especially for the South American service and required light draft in order to be able to navigate the comparatively shallow waters of the River Plate. In order to insure stability on this light draft, bulges were incorporated on each side of the hull along a considerable length and this experiment has proven quite satisfactory in stabilizing the ship. Dr. Frahm then conceived the idea of combining the anti-rolling tank and the bulges which has been successfully applied to submarines. In the case of the *Albert Ballin* and the *Deutschland* the bulge plan has been adopted in order to give stability above the ordinary rather than to overcome instability that might

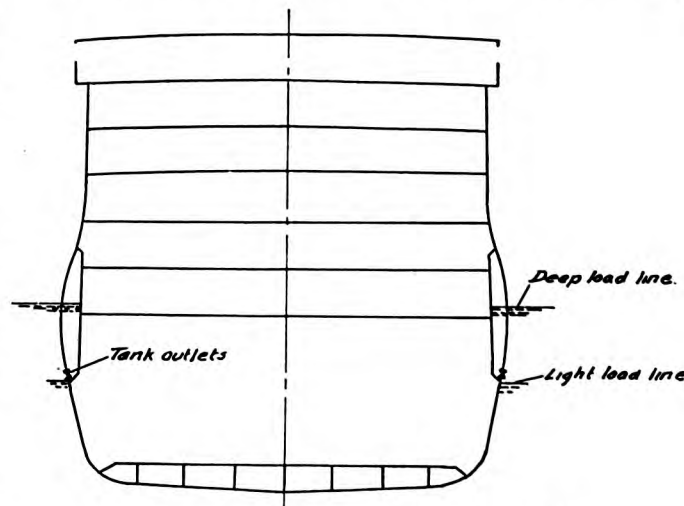


Fig. 2.—Showing Bulge Anti-Rolling Tanks

arrangement, and equipment of the kitchens, pantries, store-rooms and refrigerator rooms for the large quantities of food supplies required, so as to furnish the best possible service and cuisine.

The third class, which is provided with a large and tastefully appointed social hall, smoking room and dining room, the latter with a capacity for 420 passengers, will have state-

room accommodations for 660 passengers in 2-, 4- and 6-berth rooms. Additional space for about 440 third class passengers in large and well-ventilated compartments for families can be arranged for, if necessary.

For the safety of the passengers and crew adequate life boats are provided, suspended from the latest approved type of davits. A powerful wireless station is located on the uppermost deck of the ship. The hull is divided into numerous watertight compartments which can be controlled from the captain's bridge. In addition there will be provided all modern safety devices, such as smoke detecting apparatus (Rich system) for fire prevention, submarine bell system,

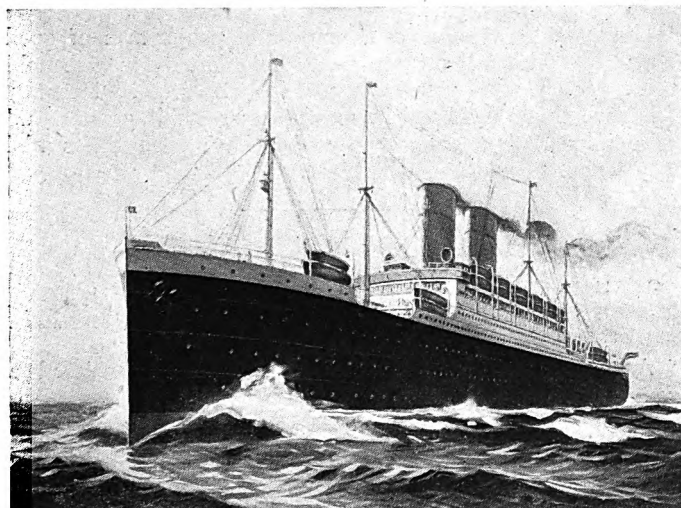


Fig. 3.—Steamship Albert Ballin Recently Launched at Hamburg

telephone connections to all departments of the ship, gyroscopic compasses, automatic steering device, etc., etc.

The engine room is equipped with steam driven turbines with double reduction gears, which will develop 13,000 horsepower, giving the vessel an average speed across the Atlantic of $15\frac{1}{2}$ knots. The 8 large Scotch boilers are fed with fuel oil and equipped with Howden's forced draft. The oil is carried in specially built oil bunkers, as well as in the double bottom, which are provided with every known safety device.

System for Handling Bunker Oil From Storage

A SYSTEM of fuel treatment which supplies a practical method of handling lower grades of fuel oil from storage is being manufactured by Row and Davis Engineers, Inc., New York, under the name of the RanD system. This system, it is claimed, reduces the cost of upkeep and costly delay in handling fuel oil by avoiding the use of steam heating coils in the inner bottom tanks. In the RanD system circulation is maintained in every part of the tank by means of a jet of heated oil forced into the mass of cold oil. This jet of hot oil comes from a discharge nozzle shown in Fig. 2, which is so constructed that it revolves slowly in a horizontal plane, thereby causing agitation in every direction throughout the tank.

The supply of hot oil comes from a central heater located in the boiler or engine room with connection to a circulating pump which, in ships already constructed, is generally the existing transfer pump.

If the vessel is not fitted with a supply or settling tank, a specially designed bulkhead connection is fitted with frames and covers to which is attached a heating coil with outside

joints and an auxiliary suction valve to the deep tank. This forms an auxiliary for temporary use after the vessel

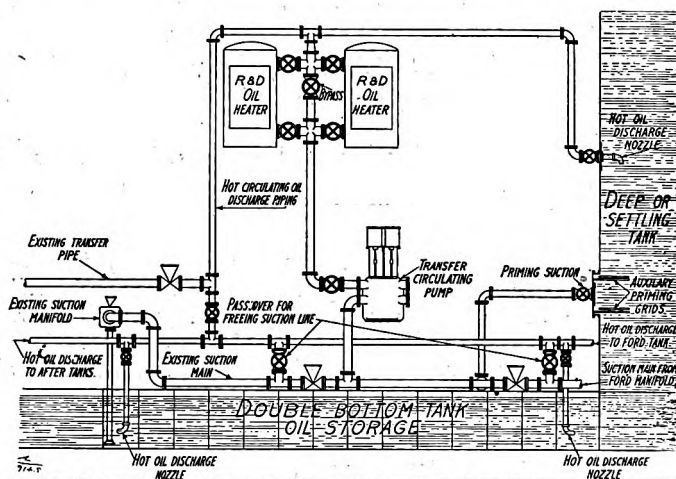


Fig. 1.—RanD System of Handling Lower Grades of Fuel Oil

has been lying at its dock and the entire mass of oil in the deep tank has become congealed. The discharge from the circulating pump is led to the central heater where the

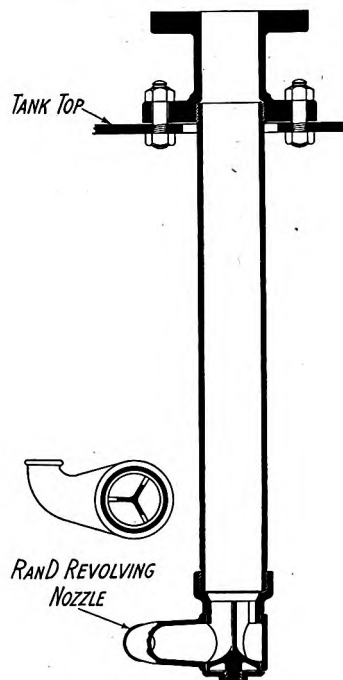


Fig. 2.—Revolving Discharge Nozzle

oil is heated by exhaust or live steam. It then goes to a main discharge pipe with distributing branches leading to the discharge nozzles of each tank compartment.

CONSOLIDATION OF WAR AND NAVY DEPARTMENTS PROPOSED.—Consolidation of the War and Navy departments into a Department of National Defense, designed to function under a Cabinet officer with assistants in charge of the army and navy, respectively, has been definitely recommended to President Harding by Walter F. Brown, head of the commission appointed to prepare a plan of government reorganization. The President has recently been giving a good deal of time to the consideration of the entire report and is expected to send a special message to Congress on it soon.

Questions and Answers Relating to Naval Architecture and Marine Engineering

Conducted by James L. Bates, Naval Architect, and W. B. Newton, Marine Engineer

This department is maintained for the purpose of answering all questions relating to ships and their machinery. All inquiries should bear the name and address of the writer. Anonymous communications will not be considered. The identity of the writer, however, will not be disclosed unless the editor is given permission to do so.

Stop Waters

Q. (1176).—What are stop waters and where are they used?

A. (1176).—Stop waters are strips of tarred hemp felt, flat lampwick or burlap, soaked in a mixture of red and white lead, or sometimes a stiff mixture of red and white lead putty. They are placed between joints where watertightness cannot be obtained by calking and also where non-watertight members pass through watertight members to prevent water passing from one side of the watertight member to the other.

See page 461 "The Naval Artificer's Manual," by Pate.

How to Remove Dent from Shell Plating

Q. (1177).—Please describe means or method of removing a dent from a vessel's plating.

A. (1177).—When the dent is not deep it is sometimes possible to remove it by hammers or jacks. If the dent is deep, a hole may be drilled in the center and a draw bolt introduced. This bolt extends through a heavy strong back placed on the concave side of the dent. As the bolt is drawn up, hammers should be used on the convex side. Under some circumstances the plate must be heated at the dent by means of a blow torch.

Outlook for Naval Architects

Q. (1181).—What do you think is the outlook in the marine engineers' and naval architects' profession for the near future? I have just graduated from a first class technical university. I feel that I cannot afford to lose much time and follow up a line which may continue to have poor prospects for new entrants for some time to come.

A. (1181).—The outlook in the marine field today, so far as that portion of it which touches and competes with foreigners is concerned, is very uncertain. We have not been a maritime nation and we do not yet really know what the attitude of the American public is toward our foreign going merchant marine.

I believe that we as a nation must ultimately, in self-defense, develop and support a foreign going merchant marine. It will probably be a matter of education and development. Such a course may be a matter of years, perhaps decades.

There is and has been for years business on the Great Lakes and along our coasts. This business has gradually built up large fleets of ships of special types.

I look for a great, possibly gradual, expansion in traffic on our inland waterways. There has been much experimental work along this line in the past ten years. This work is already showing results.

If a young man is thoroughly trained for and interested in marine work, I think he will be able to make a fair living at it, particularly if he connects himself with concerns which

deal largely in shipping for the Great Lakes, inland waterways or coast and gulf.

However, I have known a number of young men of good education and excellent ability who have left the marine field and made good in business or other branches of engineering. I believe that they have in most cases secured greater and more immediate returns than would have been theirs had they remained in the marine field.

Finest Form of Underbody

Q. (1183).—Kindly advise me as to the finest form of underbody which can be used. I am anxious to obtain a form of very low resistance and understand that destroyers are sometimes given block coefficients of 0.39 and 0.40.

A. (1183).—The block coefficient is not considered a good criterion for underbody form when speed is the governing consideration because it gives no satisfactory idea of the longitudinal distribution of displacement. It is important to have this latter information because at moderate speeds

(values of $\frac{V}{\sqrt{L}}$ less than 1.1 to 1.2) the forward portion of

the hull does the greater part of the wave making while at

high speeds (those above $\frac{V}{\sqrt{L}} = 1.1$ to 1.2) the whole body

takes part in wave making. Now a small longitudinal coefficient means a concentration of displacement amidships; that is, a large midship section and finer ends. A large longitudinal coefficient means displacement distributed toward the ends or a moderate midship section and relatively full ends. Hence, for vessels of moderate or slow speeds in which low resistance is a governing factor a low value of the longitudinal coefficient is desirable. In vessels of high speed a high value of the longitudinal coefficient is used.

You have given no idea of the type of vessel or the speed which you have in mind. The following figures taken from successful vessels may prove of value:

	No. 1	No. 2
Length	510 feet	289 feet
Beam	63 feet	26.1 feet
Draft	20.5 feet	8.3 feet
Displacement, tons	10,000	742
Block coefficient	0.53	0.415
Midship section coefficient	0.98	0.67
Longitudinal coefficient	0.54	0.62
Designed speed—knots	23	30
Values of speed-length ratio, $\frac{V}{\sqrt{L}}$	1.015	1.76

No. 1 is a fuller vessel than No. 2 when judged by the block coefficient, but as shown by the longitudinal or prismatic coefficient it is a finer ended vessel.

The speed-length ratio for No. 1 is much lower than that for No. 2. The values of the longitudinal coefficients are suited to these speed-length ratios.

The *Shipbuilding Cyclopedia*, Basic Design Section, gives data for the selection of suitable values of longitudinal coefficient for varying values of the speed-length ratio.

NEW BOOKS

Notes and Calculations on Marine Propulsion and Practice

Reviewed by H. Bakewell-Taylor*

THE MARINE POWER PLANT. By Lawrence B. Chapman, Professor of Naval Architecture, Lehigh University. Size, $5\frac{3}{4}$ by $9\frac{1}{4}$ inches. Pages, 320. Illustrations, 113. Tables, 15. New York, 1922. McGraw-Hill Book Company, Inc. Power Plant Series.

This book represents in printed form a series of lectures given by Professor Chapman to the marine engineering students of Lehigh University. The chapters are well written and possess the great commendation of brevity without loss of substance and necessary facts.

The little volume, while being intended for the elementary classes in marine engineering, contains much information in a compact form to make it useful as a reference book to marine engineers, draftsmen and superintendent engineers, and it could be studied with much advantage by the sea-going engineers of our merchant marine desiring a fuller knowledge of certain facts and figures connected with their profession as well as by operators who wish a closer grasp of marine engine practice and progress. While not as large and detailed a work as the well known volumes of Seaton, Durand and Bauer, nor along the more specific lines of those by Dyson, Peabody, Barnaby and Bragg, the book is nevertheless a distinct addition to the all too scarce well arranged and up-to-date literature on marine engineering design, principles and practice.

The chapters are clearly written and well illustrated and the text, other than simple and necessary equations and formulæ, has been kept particularly free from involved mathematics, the author giving, however, some very useful curves and tables as well as a number of fully worked out examples in marine power plant design and also some general arrangement of machinery drawings.

The book includes chapters on Thermodynamics of Steam, Fuels, Marine Boilers, Combustion, Draft, Superheaters, Reciprocating Engines, Turbines and Gears, Combination Machinery, Steam and Diesel Electric Drives, Diesel Engines, Condensers, Air Pumps and Feed Heaters, Power Plant Layouts, Computations for the Power Plant of the Merchant Ship, together with a chapter on Comparison of Coal and Fuel Oil for Steamships. The author has confined himself to stating the broad principles of each subject dealt with in the various chapters of the work, and has conservatively analyzed and presented the conclusions drawn therefrom. While ship-resistance, propellers and detailed engine design are only briefly touched upon, readers are referred to authoritative works on these and kindred subjects.

The tables and data given cover Machinery Weights per Horsepower, Steam and Fuel Consumption per Horsepower, Steam Consumption of Marine Auxiliaries, Reduction Gears, Condenser Performance, Comparison of Machinery Installations, Diesel Engine Trials, Diesel and Electric Drive Ship Particulars, Performance of Steam Reciprocating Engines, Particulars of Fuels, etc., etc. The worked out calculations and examples for proposed designs of propelling machinery are clearly presented, and the general data in the text are for the most part up to date and reliable in so far as they could be analyzed in the limited time given to a preliminary study of the volume.

*Chief Turbine Engineer and Chief Inspector for United States Shipping Board, New York.

We would suggest that in a future edition the chapters be a little more logically arranged in engineering sequence, and that certain illustrations be placed with the text of the chapters they are to illustrate, particularly those of the Howden Forced Draft System shown on pages 84 and 85; also certain similar figures should be numbered "a" and "b" so as to conform to the practice followed elsewhere in the volume, and Fig. 60, showing the General Electric Company's type of Geared Turbine, which has evidently been accidentally omitted, should be included.

In conclusion, the author is to be complimented on turning out a handy, lucid and excellent little volume which should add to the series it is written for and be on the bookshelves of marine engineers, naval architects and operators, in addition to providing the students for whom the lectures were prepared a permanent printed record of them.

LETTERS TO THE EDITOR

A Proposed Remedy for Vibrations Caused by the Propeller

A POINT that is frequently overlooked in propeller design is the tendency of the wheel to produce vibrations. To be sure, these are often caused by disturbances which are outside of the province of the designer, such as unequal pitch, which may be due to warping of the blades or poor workmanship when the blades for a built-up propeller are assembled. These, however, are probably of a small magnitude in comparison with the one con-

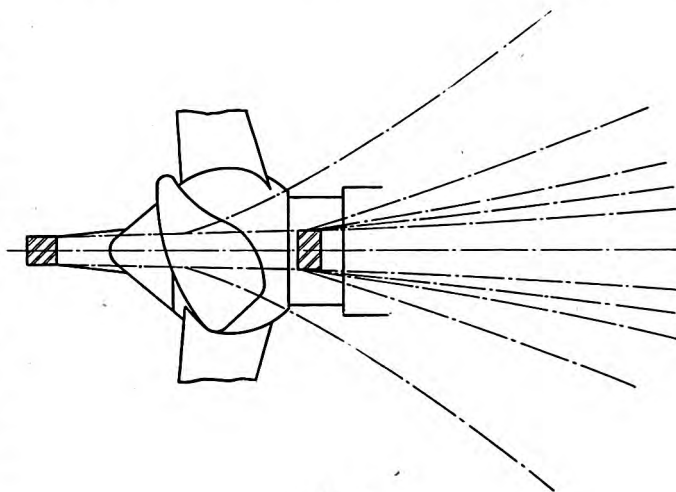


Fig. 1

trolled by the designer, namely the distribution of the blade area.

Fig. 1 shows roughly the waterlines of a single screw ship with a propeller of the conventional right handed type. In order to explain the action of this propeller in a simple way we shall refer to a propeller pump with guide vanes. When these guide vanes are pointed in the direction of rotation a minimum discharge is obtained, whereas if the guide vanes are pointed in the opposite direction, or against the rotation, it is a well known fact that the discharge will be a maximum.

Referring to Fig. 1, it is shown that the ship's lines resemble very closely the guide vanes of a propeller pump, at least to an extent sufficient to invite a discussion. If we study a blade as it approaches the top, we find that at first, when it is horizontal, feed is normal, then as the blade moves

closer to the top a reduced feed is experienced because the lines of the ship follow the direction of rotation. The feed reaches a minimum when the blade is about to pass the sternpost, and it is therefore obvious that, as less work is performed, the torque will also reach a minimum. In ships that have a heavy deadwood and have the propeller working in close proximity to this, very severe vibrations are encountered; the dangers of this kind of construction are, however, generally realized.

It might be argued that in a ship with a very fine run this tendency for vibration should be obviated, but it must be remembered that in this case the whole stern structure will respond more readily to any disturbance.

When the leading edge of the blade has passed the sternpost, the ship's lines are inclined against the direction of rotation and the feed, and consequently the torque, will, therefore, tend towards a maximum. Where the angle of the run is large this change will naturally cause an increase in the fluctuations. As the blade moves on, the stream lines following the sides of the ship and the wake acting on the back side of the blade cause the torque to reach a maximum. This cycle will of course be repeated as many times per revolution as there are number of blades per propeller and thereby produce vibrations. The same discussion also applies to the lower side, although in most cases to a less degree.

The obvious remedy for this trouble would of course be to have the propeller removed as far as possible from any influence of the ship, an attempt to which is found in the rake of the blades. This, however, is not sufficient and we must

rupture screw turbine steamer. It is probable that vibrations were partly responsible for this change, because any reduction in propeller efficiency caused by the overlapping blades would probably not be tolerated in an installation of this size unless it were absolutely necessary. The stress at the root of the blade could not have been the only cause, because the added metal which increases the blade area at this point has practically no influence on strength.

From a purely economic point of view, it should undoubtedly prove beneficial to pay close attention to this subject of distribution of blade area and shape of the leading edge, inasmuch as it results in a smoother working of the entire installation and thereby reduces the maintenance cost.

Kingfield, Me.

HAROLD ANDERSON.

Why the Poughkeepsie Did Not Make Her Speed

The *Poughkeepsie*, which was recently placed in operation on the Hudson river between Poughkeepsie and Highland, N. Y., is the first ferryboat to be constructed on the "Hullfin" principle. She is 140 feet in overall length, 52 feet in extreme beam and has a loaded draft of 9 feet 6 inches.

The main part of the hull is broad and shallow, having no overhanging ends or guards. It is built of steel and designed with the extra strength necessary to permit its use as an ice breaker in unusually heavy ice. On the bottom of the hull a fin is constructed that is six feet wide and six feet deep amidships. This fin is made just wide enough to allow for the installation and care of the electric propulsion motors and tapers in width to the stem and stern posts which are placed about 20 feet back from the ends of the hull.

The propelling machinery consists of two six-cylinder Diesel engines of 150 horsepower each, which are directly connected to two 90 kilowatt generators which in turn were supposed to actuate two electric motors of 100 horsepower each at 600 revolutions per minute. This ferryboat was intended to make 10 miles per hour with this minimum power plant and would have done so, but right after a permit to use the "Hullfin" patents had been obtained the inventor was not allowed to co-operate in the construction of the vessel and many parts of the hull were built in direct opposition to his advice.

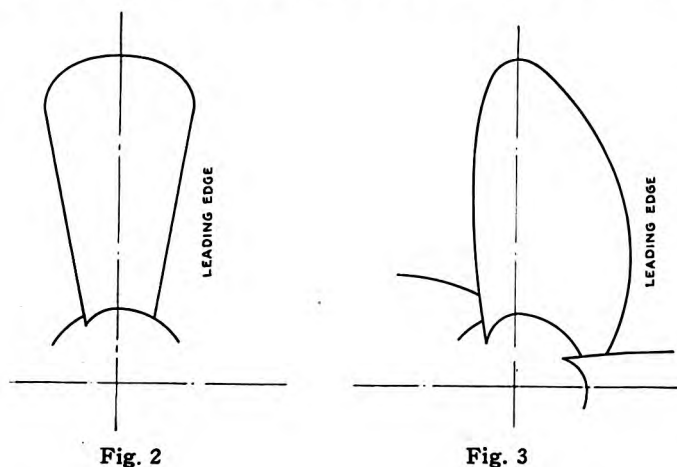
The following are my reasons why the ferryboat did not make her intended speed: First, the fin was built two feet deeper than was necessary or intended, creating quite an unnecessary drag.

Second, although a 3½-inch propeller shaft was considered ample by the machinery people for the size of the wheels and the power applied, a 5-inch shaft was used, wasting much power.

Third, the stern posts of the fin and the fore-and-aft edges of the rudders were unnecessarily thick, which greatly disturbed the water in the vicinity of the high-speed propellers.

Fourth, the propellers were found to be much larger than the motors could turn. The design called for 600 revolutions per minute, but only 350 could be obtained, which gave returns equivalent to half speed and power. The only way to obtain the full efficiency from the power in this craft is to design the propellers with a smaller diameter and less pitch, and with edges properly shaped for the high revolutions.

Fifth, the bow of the fin is located well aft of the bow of the main part of the hull where the bottom is wide. The forward wheel drives the water faster as it spreads along the wedge shaped side of the fin and when this water arrives at



therefore look for another remedy. Figs. 2 and 3 show two blades with extremely different outlines. The leading edge of Fig. 2 is straight in a radial direction, whereas Fig. 3 has a gradually curved leading edge. If we now apply the above discussion to these blades, we find that the entire length of the leading edge shown in Fig. 2 will enter the region of maximum feed very suddenly and the change from minimum to maximum torque will therefore be almost instantaneous. The curved edge of the other blade, Fig. 3, will on the other hand change from minimum to maximum conditions very gradually and the fluctuations will be very diminished. If special attention were paid to this feature when designing a new propeller, it would be almost possible to build a propeller having no vibrations. This kind of blade would also perform much better when the propeller is only partly submerged.

It must of course be admitted that a blade of this type, having the maximum blade area near the hub, is not quite as efficient as a blade of standard shape but all engineering is of necessity a compromise to arrive at the best average results.

Fig. 3 is an approximate outline of the type of propeller which replaced the original wheels on a well known quad-

the widest part of the fin it is going at such a high rate of speed that it is unable to change its course quickly enough to follow the lines of the fin. Thus there is a void formed which holds on to the boat until the suction is relieved by water, as there is no opportunity for air to get there. By experimenting this suction was discovered and by the same means a remedy was found which is known as the air release. This is a means of allowing air to be drawn through holes in the skin of the vessel in the proper places to relieve the suction.

In closing, I will state that it is only necessary to reduce the size of the propellers properly, and to apply the air-release, to get fair results from the power applied. Much better results might have been obtained if all material parts had been produced with the proper degree of fineness to obtain the best results from the small amount of power.

New York.

SAMUEL GOLDEN, President,
Hullfin Boat Company.

Why More Power Can Be Obtained by Solid Injection

With the solid injection system that we use, very high net mean effective pressures, figured from the brake horsepower, are obtained. With the ordinary air injection system it is very difficult to get over 80 pounds mean *net* pressure per square inch, while with the solid injection we are able to get very high mean net effective, in some cases running as high as 135 pounds, and even slightly higher. We rate our engines at 100 pounds, at which mean net effective pressure there is perfect combustion, the height of thermal efficiency and therefore a clear exhaust.

There are three principal reasons why higher mean net effective pressures can be obtained with a solid injection. The first is the elimination of the power necessary to drive the high pressure air compressor supplying air for injection purposes. In engines of small size, it takes an average of 10 percent of the main power to drive this compressor, which is entirely saved with the solid injection. In addition to this the high pressure air expanding in the combustion chamber from 1,000 pounds to approximately 500 pounds absorbs a great deal of heat from the compressed air in the combustion chamber. This heat has been obtained at the expense of power in compressing the air in the combustion chamber. This loss of heat decreases the pressure in the combustion chamber, resulting in the loss of just that much power, which we find, by experiment and careful analysis, to be about 8 percent. It is true that the indicator card, with the air injection system, does not show any drop of pressure at the top of the working stroke; on the contrary, there is a slight raise in pressure, which is approximately five pounds, this pressure being maintained for a slight distance across the card as the piston is on the downward stroke. This loss makes a total of 18 percent, which is saved by the use of solid injection, and therefore adds that much to the mean net pressures.

In contrast with this operation of the high pressure air injection, we have the solid injection engine injecting the fuel into the combustion chamber without the thermal loss from the high pressure air, as explained above. No heat is lost from the compressed charge of air, consequently a lower compression (about 350 pounds) is equally effective in igniting the fuel. As the fuel enters through the nozzle into the combustion chamber, there is a sharp rise in pressure, which takes place at the top dead center on the working stroke and amounts to from 200 to 250 pounds. The fuel continues to enter over approximately the same length of stroke as the air injection engines (about 30 degrees), and this higher pressure, which we call the maximum work-

ing pressure, totaling approximately 550 pounds, is held over quite a period on the downward working stroke of the piston, thus greatly increasing the area of the indicator card, resulting in a much higher mean net effective pressure.

It is true that the mean indicated pressures of the air injection engines are nearly as high as those on the solid injection. No doubt they would be the same, if it were not for the thermal losses from the expanding high pressure air, because the mechanical losses are about the same in each type, except that which is accounted for in the high pressure air compressor.

The extremely high mean effective pressures which can be obtained from solid injection are due, so far as we are able to ascertain, from what the refining companies call the cracking process. Our theory of this matter is very well borne out by an analysis of the exhaust gases and from a knowledge of the characteristics of oil under similar conditions. We explain it in the following manner:

Oil is made up of little cells, which we may consider for the moment as being circular and similar to a grape, with an outside skin composed of the lower carbons, while the interior contains the higher volatile hydrogens, and also probably contains a slight pocket of gas of some form. When oil is put under a high pressure (1,000—4,000), as it is for solid injection, it compresses slightly. It is very probable that this compression is allowed by the small gas pocket contained within the cells of the oil. When these cells escape quickly from their high pressure in the nozzle they expand quickly to their natural shape and, assisted by the heat in the combustion chamber, they burst, thus releasing the hydrogen, or, as some term it, freeing the carbon. The hydrogen burns, or rather unites more readily with the oxygen than does the carbon, and generates a good deal more heat per each unit of H_2O than per unit of CO and CO_2 . By releasing an excessive amount of oil in a combustion chamber it appears that the hydrogen burns first to a large extent, thus greatly increasing the heat and power, as long as there is oxygen left for it to unite with, and leaving the carbon in the form of gas still unburned and which is driven out through the exhaust on the scavenging stroke. This, of course, is not good economy, and consequently we rate our engines at a low enough mean effective pressure, to give the height of thermal efficiency and fuel economy. This is about 100 pounds per square inch.

The rise in pressure at the top of a working stroke, by the use of solid injection is sometimes called detonation and can be well considered as such except that it is not the kind of detonation experienced in a gas engine, where it is more or less objectionable, owing to the inability of controlling the point of pre-ignition, which causes the detonation in the gas engine. With a Diesel engine the point of ignition is absolutely controlled by the timing of the valve, thus getting power from these detonations, and still having a soft, smooth running engine, very similar to a steam engine which always has a certain amount of lead, as well as lap, to cushion the impulse over the center.

Oakland, Cal.

O. A. TREIBER,
Atlas Imperial Engine Company.

THE AMERICAN ENGINEERING STANDARDS COMMITTEE has approved as "Tentative American Standard" the methods for the chemical analysis of alloys of lead, tin, antimony and copper—otherwise known as babbitt metal—submitted by the American Society for Testing Materials. Two methods of analysis are included in the document approved by the A.E.S.C. The first is a quick and fairly accurate method intended for practical or shop use; the second is a slower, more elaborate and more expensive, and more exact method intended for reference purposes or for the settlement of disputed questions.

PERSONAL MENTION

G. F. S. MANN has become connected with the estimating department of the Charles Ward Engineering Works, Charleston, W. Va.

A. J. PASCH has been appointed head of the South American and West Indian trades for the Shipping Board, effective January 15, vice S. W. Pierce, resigned.

JOSEPH T. MARTIN is now engaged in business at Baltimore, Md., as a consulting engineer and marine surveyor with offices at 409 Exchange Place.

FREDERICK FRANZ, who for the past four years has been chief engineer of the Terminal Engineering Company, manufacturers of industrial trucks for marine terminals and the like, has established an engineering office at 27 Warren street, New York City.

MICHAEL D. SCHAEFER, who has been the civilian aid to the chief constructor, U. S. Navy, for many years, has resigned from the service to engage in private business with Commander J. W. Barnett, Jr. Mr. Schaefer probably knows personally more people in the marine field than any one else connected with the industry and his genial personality certainly entitles him to the best wishes of all his friends in the new venture. It is understood that Messrs. Schaefer and Barnett will specialize on Diesel engines, motorships and submarines and that they will also act as agents in Washington, D. C., for the Marine Decking and Supply Company and the Huhn Manufacturing Company.



Michael D. Schaefer

G. T. BRADLEY, formerly traffic manager for the United States Shipping Board at Baltimore, has been transferred to New York as assistant head of the European and Mediterranean Trades Division. Donald F. Washburn succeeds Mr. Bradley as traffic manager at Baltimore.

FRANK E. BOYD, formerly of the marine department of the Westinghouse Electric and Manufacturing Company, has been appointed general sales manager of the Harrisburg Foundry and Machine Works, builders of the dual clearance "Unaflo" and piston valve engine.

F. P. GUTHRIE, head of the Radio Division Operating Department of the Emergency Fleet Corporation, has been designated by Chairman Lasker as the representative of the Shipping Board and Emergency Fleet Corporation to serve as a member of the inter-departmental committee on electrical communications.

N. A. SMYTH has been elected president of the United States P. and I. Agency, Inc., a new organization with headquarters at 25 Broadway, New York, which has recently been set up by the United States Shipping Board to take over the protection for its ships now handled by the Steamship Owners' Association.

A. F. MACK, North Atlantic district manager of the Emergency Fleet Corporation of the United States Shipping

Board, has tendered his resignation on account of pressing business interests. He will be succeeded in this office by W. J. Love, vice-president and general manager of the Emergency Fleet Corporation.

S. W. PIERCE, who since the war has been actively associated with the United States Shipping Board and for more than two years was the head of its South American and West Indies freight department, has resigned to become vice-president of W. E. Hodges and Company, 25 Beaver street, New York, steamship agents and freight brokers.

DEAN J. HANSCOM, formerly foreign passenger agent of the Admiral Oriental Line, Seattle, Wash., has been appointed general agent of the company. Mr. Hanscom was one of the pioneers for the company when it opened its offices in the Orient in 1918, where he spent three years. He later returned to Seattle where he became foreign passenger agent.

L. L. BATES, foreign freight agent of the Admiral Oriental Line, Seattle, Wash., has been appointed general freight agent of the Line. Mr. Bates began his service with the company as a dock hand. Following his appointment as foreign freight agent he made a trip to the Orient to study conditions which was soon followed by his present promotion as general freight agent.

H. B. TAYLOR, who has been well known about New York as chief turbine engineer for the United States Shipping Board, has resigned to accept an appointment as marine superintendent with the Pacific Mail Steamship Company of San Francisco, California. He will have charge of the 535-foot passenger ships which this company is operating. Mr. Taylor's first engineering experience was obtained as an employee of the Parsons Steam Turbine Company in Great Britain. He subsequently became associated with the marine industry on the west coast of America, some thirteen or fourteen years ago, and held various executive positions in the shipbuilding and repair plants in Seattle and British Columbia. About three and a half years ago he accepted an appointment with the Shipping Board. He first joined the board in Philadelphia and was assigned to duty as an engineering inspector. After about one year he was transferred to the repair department at New York as chief turbine engineer and later assumed the duties of chief inspector as well, which positions he held up to the time of his resignation on December 15, 1922.

GEORGE W. WALKER has been appointed chief turbine engineer for the New York office of the United States Shipping Board, to succeed H. B. Taylor, resigned. Mr. Walker's appointment was received with great satisfaction by his associates, who have found him a well-balanced executive as well as an able engineer. He received his early training abroad and took to the sea while a young man. After following the sea for a number of years and obtaining his license as a marine engineer, Mr. Walker became interested in power plant work and was subsequently engaged in this branch of engineering in Chicago for a period of ten years. He maintained a lively interest in marine engineering, however, and still holds his license as marine engineer.

Mr. Walker first became identified with the Shipping Board about four and a half years ago, when he was appointed resident inspector at the plant of the Westinghouse Electric Company at East Pittsburgh, Pa. After serving as resident inspector at the Westinghouse plant for about two years, he was transferred to the New York office to assume the duties of assistant chief turbine engineer. These duties he has carried out for two years and a half, with credit to himself and the Shipping Board, his efficiency in handling the tasks assigned him resulting in the promotion just received.

Shipbuilding, Reconditioning and Operation

Port Expansion, Passenger and Freight Activities and Other
Notes of Interest in All Branches of the Marine Industry

Over \$318,000,000 Worth of Marine Work In 1921-22—Now for the New Year

IT is apparent that 1922 closed with business in much better condition than even the most optimistic had dared hope. Statistics compiled by MARINE ENGINEERING AND SHIPPING AGE show that there was reported in its columns in 1922 a total of more than \$84,981,517 worth of vessel construction and reconditioning work, when it was in contemplation, and over \$50,242,824 in contracts placed for similar work. In addition to this, there was also carried information on approximately \$88,106,661 worth of port work in contemplation with contracts awarded for such enterprises amounting to over \$11,286,004. For the year 1921, information was reported on all classes of marine work having a value of more than \$83,000,000, the total for the two-year period covering vessel construction, reconditioning, port and pier development, equipment, etc., well in excess of \$318,605,006.

To say that 1923 will start auspiciously is no exaggeration as inquiries by MARINE ENGINEERING AND SHIPPING AGE as to the prospects for the new year show encouraging results. It is expected that the first six months of 1923 will be featured by the placing of contracts for at least four new combination passenger and freight ships, reported during 1922 as in contemplation, and having a total estimated valuation of \$6,000,000. In addition to this new construction work, which at the present time seems practically assured if present plans are carried out, \$6,500,000 worth of ship reconditioning work involving the steamships *Agamemnon*, *Mount Vernon*, *President Grant* and *America* will also be in the hands of American shipyards during the early part of 1923.

Next Marine Show

Nov. 5-10, Architects

Meet Nov. 8 and 9

THE third annual exposition of the American Marine Association will be held in the Grand Central Palace, New York City, during the week of November 5-10, 1923, according to latest official announcement. In conjunction with the exposition, the Society of Naval Architects and Marine Engineers will hold its 31st annual convention November 8-9, the society's annual banquet being held on the evening of November 9 at the Waldorf-Astoria Hotel.

Reconditioning Bids

Rejected; New Boats

Planned Instead

IT is learned through the firm of Chapman & Fisher Company, Inc., consulting engineers and naval architects, Philadelphia, Pa., that the bids recently taken for the rebuilding of the passenger steamer *New Jersey* for the account of the Burlington Island Amusement Company have been set aside. The lowest figure submitted was \$119,500.

It is understood that instead of rebuilding the *New Jersey* the owners have decided to build new vessels. Plans for these proposed boats are expected to be complete during the first part of the year.

The Chapman & Fisher Company have also taken over a proposition to engineer and construct a water terminal along the Atlantic Seaboard.

Plans and Specifications

in Course of Preparation

for Overhauling Four Ships

The *Agamemnon*, *Mount Vernon*, *President Grant* and *America* to be Put Into Service—*America* Out First With Specifications to Bidders in From Four to Six Weeks

SIX and one-half million dollars worth of ship reconditioning work on the biggest American merchant ships will be placed during the early part of 1923, according to data obtained by MARINE ENGINEERING AND SHIPPING AGE. Marked official activity has been evidenced with regard to the steamships *Agamemnon*, *Mount Vernon*, *President Grant* and *America*. Naval architects and draftsmen are already at work on the preparation of plans and specifications for the *America* contract and the *President Grant*, *Agamemnon* and *Mount Vernon* will follow in their turn.

AGAMEMNON-MT. VERNON

It is learned that on November 10, Shipping Board Commissioner Lissner, Vice-Presidents Love and Sheedy, Captain Bookwalter (in charge of the laid-up fleet), George Nichols (Assistant to Vice-President Sheedy), William F. Gibbs (naval architect in charge of reconditioning the *Leviathan*); C. A. Peterson and W. L. Bunker, representing the United States Lines, made an inspection of the *Agamemnon* at Hoboken, N. J. The *Mount Vernon* is at Boston and it is understood that Shipping Board officials have reported favorably to Chairman Lasker on the subject of reconditioning these two ships. It is estimated that the cost of the work proposed to be

done on the *Agamemnon* and *Mount Vernon* will reach a total of close to \$5,000,000 or two and one-half million, each.

Following the inspection of the *Agamemnon* by the officials mentioned above it was announced that the Board would appoint a Survey Board to make a complete inspection, or what is known as a scientific survey, of the two ships. So far as known at this time the personnel of this board has not been decided.

THE "BIG FOUR"

It is learned that according to present plans the *Leviathan*, undergoing reconditioning by the Newport News shipyard, at a contract price of \$8,200,000, will be taken
(Continued on page 56)

\$6,500,000 Repairs

(Continued from page 55)

over by the United States Lines. This great ship, it is stated, is to be run jointly with the *George Washington*, the *President Harding* and the *President Roosevelt*. These vessels, forming the main portion of the United States Lines fleet and operating in conjunction with each other, will form an enviable "Big Four," ranking as leaders of the world's transatlantic passenger carriers.

RECONDITIONING AUTHORIZED

According to reliable advices obtained by MARINE ENGINEERING AND SHIPPING AGE, the Shipping Board has authorized the reconditioning of the steamships *America* and *President Grant* as cabin and third class passenger ships. The *America*, the second largest ship in operation under the American flag, is now in the service of the United States Lines as a first, second and third class carrier. After a few more trips she will be withdrawn from the route for cabin conversion. This work will include the alterations and installations necessary for the accommodation of about 800 cabin and 1,200 third class passengers in rooms. The ship will re-enter the United States Lines' service for the early summer season.

The *America* has an overall length of 687 feet, beam 74 feet 3 inches, depth 52 feet 5 inches and speed about 17 knots. It is expected that after her conversion she will be the largest cabin carrier in the world.

Latest reports indicate that the *America's* reconditioning will be carried out under the direction of Captain R. D. Gatewood, Manager of the Maintenance and Repair Department of the Shipping Board. Preparation of plans and specifications will be done under the supervision of C. A. Petersen, naval architect for the United States Lines, and A. D. Woods, naval architect for the Shipping Board, Maintenance and Repair Department.

The specifications will cover the reconditioning of the hull and machinery; the rearrangement of present and installation of additional public rooms; overhauling the present and, wherever necessary, the installation of new systems such as ventilating, heating, electric, sanitary, etc. Specifications will probably be available to bidders in from four to six weeks.

THE PRESIDENT GRANT

In the case of the *President Grant*, the ship is to be reconditioned as a cabin and third class carrier, also for the United States Lines, to be run in conjunction with the *America*. Although no details were available at present as to who will prepare the plans and specifications for this contract, it is learned that the work has been authorized. It will include, among other things, the installation of new decks, the alteration of present and installation of new cabin accommodations, lifeboats, davits, re-equipment and refurnishing of new passenger accommodations, overhauling of engine and boiler rooms, main and auxiliary machinery, the ship's electric, ventilation, pump, sanitary systems, etc.

Wilmington Iron Works Low Bidder For Steel Barge

THE Wilmington Iron Works was low bidder for the construction of one 60-foot by 22-foot by 4-foot steel barge, at the opening of tenders at United States Engineer Office, Wilmington, N. C., December 26.

Plans and Specifications Out For Construction of Two Eastern Ships To Cost About \$3,500,000

First Big Job of New Year Provides For Highly Modern Passenger Steamers For New York-Boston Night Run—Will Be 402

Feet Overall Length, Turbine Driven, Oil Burning, For Express Service.

PLANS and specifications have been issued for the construction of two passenger steamers for the Eastern Steamship Lines, Inc., of which Calvin Austin, India Wharf, Boston, Mass., is president, bids to be received until about January 10, at the office of the designer of the vessels, Theodore E. Ferris, naval architect and marine engineer, of 30 Church street, New York City. It is believed the two ships will cost a total of close to \$3,500,000. A period of fourteen months is allowed for the delivery of the first vessel and fifteen months for the second.

Each steamer will have a length overall of 402 feet, length on 15-foot waterline 396 feet 4 inches, length between perpendiculars 385 feet, beam over guards 72 feet 6 inches, beam at 16-foot 6-inch waterline 56 feet 6 inches, depth molded to main deck at side 23 feet 9 inches, load draft 16 feet 6 inches. The steamers will be turbine driven and oil burning and will be put into service as night boats between New York and Boston, operating through the Cape Cod Canal, having a nominal speed of 17 knots with a possible maximum speed of 19 knots. The displacement on a 16-foot 6-inch draft will be 5,300 tons.

It is intended that the steamers will carry but one grade of passengers in rooms and in separate open spaces for berth travel of men and women. The total number of regular passenger rooms (two persons each) will be 267; de luxe rooms with adjoining baths (two persons each) 14; special rooms with adjoining toilets (two persons each) 64; or a total of 345 rooms accommodating a total of 690 passengers; while the berth travel is to accommodate 160 men and 50 women, making accommodations sufficient for the care of a total of 900 passengers.

The vessels will be twin screw, steel, sponson-sided type with freight space on the main deck and one freight hold, constructed with transverse framing, having complete double bottom and will be modernly equipped in every respect. The steamers will be equipped with lifeboats under davits with collapsible boats stowed under. This equipment is to consist of four metallic lifeboats, 24 feet by 7 feet by 3 feet, for 30 persons each; twelve

metallic lifeboats, 26 feet by 7 feet 9 inches by 3 feet 4½ inches, for 40 persons each; and twelve collapsible lifeboats, 24 feet by 7 feet by 2 feet, for 40 persons each. It is understood that the steamships are not to be built under the inspection of any classification society but all materials must fulfill mill tests required by the rules of the American Bureau of Shipping.

PROPELLING MACHINERY

The propelling machinery will consist of two latest design Parsons' single reduction gear steam turbines and six cylindrical return tube Scotch boilers, 16 feet 4 inches inside diameter by 11 feet 8 inches long over top heads, built for a working pressure of 200 pounds per square inch, and one donkey boiler, vertical, wet uptake type, 6 feet inside diameter by about 101 inches high for use during the winter layup period of the steamers, built for 150 pounds per square inch working pressure.

The twin screw turbine propelling machinery will be built from designs furnished by the Parsons' Steam Turbine Company, Ltd., of Wallsend-on-Tyne, England, and each set will consist of one high pressure and one low pressure ahead turbines in series, each driving a separate pinion through single reduction gearing. Astern turbines of the impulse type will be incorporated in each low pressure ahead turbine. The revolutions of the turbines at full power ahead will be as follows: high pressure turbines, 1,920 revolutions per minute and the low pressure turbine, 1,920 revolutions per minute and at these revolutions, developing a total of not less than 6,400 shaft horsepower. The speed of the propellers under these conditions will be 120 revolutions per minute.

BOILERS

The six boilers will be arranged for two firerooms, with grates fore and aft, and will be fitted with the Howden system of heated forced draft. The total effective heating surface of the boilers will be about 21,000 square feet. The furnace fronts of each boiler are to be arranged for burning oil fuel on the White system, as manufactured by the Todd Shipyards Corporation.

Construction of New Mississippi Steamer Proposed

CAPTAIN GORDON GREENE, of Cincinnati, O., is contemplating the building of a new stern wheel, all steel, river steamer, according to information obtained by MARINE ENGINEERING AND SHIPPING AGE. The boat will be of the Mississippi River type, about 170 feet long, and is to take the place of the steamer *Tacoma*, recently destroyed in a disastrous riverfront fire at Cincinnati. Captain Greene proposes to use as much of the machinery of the burned steamer as is possible in the new boat and will probably build new boilers.

Bids Open Jan. 27 at Florence, Ala., For Four Barges

UNITED States Engineer Office, of Florence, Ala., will receive sealed proposals until 11 A. M., January 27, for the construction and delivery of four steel barges to be delivered at Paducah, Kentucky.

The boats will have a length molded of 120 feet, beam molded 36 feet, depth molded 7 feet 6 inches. Each barge will be equipped with deck fittings including four 36-inch cleats, four 7-inch double bitts and four 30-inch open chocks, all of cast steel and of approved design.

Secretary Hoover Assures Standardization Committee Hearty Support at First Meeting

THE first meeting of the general committee appointed by Col. E. A. Simmons, chairman of the informal conference on elimination of waste in ship construction and operation through standardization held at the Grand Central Palace, New York City, on November 10 last under the auspices of the American Marine Association, convened at the Department of Commerce, Washington, on December 20. There were present Charles F. Bailey, Engineering Director of the Newport News Shipbuilding & Dry Dock Company, representing the shipbuilders for machinery; Hugo P. Frear, Naval Architect of the Bethlehem Shipbuilding Corporation, representing shipbuilders for hull construction and hull fittings; Commander R. D. Gatewood, representing the U. S. Shipping Board; W. F. Gibbs, representing the American Steamship Owners' Association; Capt. C. A. McAllister, representing the American Bureau of Shipping; Capt. John F. Milliken, representing masters, mates and labor organizations; E. H. Rigg, Naval Architect of the New York Shipbuilding Corporation, representing the Society of Naval Architects and Marine Engineers; Rear Admiral Robert Stocker, U. S. N., representing Admiral J. K. Robison of the Bureau of Engineering of the Navy Department, who was unable to be present; Brig. Gen. H. Taylor, representing (unofficially) the Corps of Engineers, U. S. Army; Capt. J. T. Tompkins, U. S. N., who represented the Bureau of Construction and Repair of the Navy Department in place of Rear Admiral J. D. Beuret; and Gen. George Uhler, representing the Steamboat Inspection Service of the Department of Commerce. Rear Admiral W. S. Benson, of the U. S. Shipping Board, also attended the meeting at Col. Simmons' invitation; while the Department of Commerce was represented by Ray M. Hudson of the Division of Simplified Practice. The meeting was called to order at 10:30 A. M. by Chairman Simmons, who then presented the Hon. Herbert Hoover, Secretary of Commerce.

Mr. Hoover, who made his personal interest in the movement known at its inception, expressed his views in general of the possibilities for standardization in the marine field and told of the work of the Department of Commerce in other industries. He also assured the committee that it could depend upon the hearty support of the Department which, however, would at no time attempt to dictate.

Mr. Hoover was followed by W. A. Durgin, Chief of the Division of Simplified Practice of the Department of Commerce, who illustrated his views of possibilities for standardization in shipbuilding by supplementing Mr. Hoover's remarks to the extent of amplifying what he had said about results by a detailed description of actual accomplishments, especially in manufactured lumber and bricks. While Mr. Durgin acknowledged that those industries were hardly comparable with shipbuilding, he pointed out that the principle was basic and then showed its application to ships' parts by concrete examples.

Admiral Benson then told of the two conferences in his office, one on November 16 and another on December 13, with representatives of shipbuilders and manufacturers of electrically operated auxiliaries called for the purpose of determining what, if anything, could be done in the matter of standard designs and specifications for Diesel en-

gine installations for the some five types of steam propelled vessels that the Shipping Board is offering for sale. He explained that because of the acknowledged superiority in low operating and maintenance costs of Diesel engines for ships of approximately the tonnage of those under discussion (3,000 to 9,600 tons) and the number of vessels involved, quantity production and lower costs would be possible if the equipment could be standardized. The result of the two meetings was that the more important yards in the United States have been asked by Admiral Benson to reduce their respective ideas to tentative plans and specifications for use as the basis for a third conference to be held at some convenient point, perhaps Philadelphia.

Following Admiral Benson's talk, the committee proceeded to discuss the form the permanent organization should take, with the result that it was decided to follow the British panel plan by dividing the United States into three panels—(1) Atlantic Coast and Gulf; (2) Great Lakes; and (3) Pacific Coast. Within each panel there will be a series of small sub-committees, to which will be assigned the task of determining certain specified standards. That the time and expense involved shall be reduced to the minimum, most if not all of the sub-committees will be divided territorially as to membership, with groups in the various shipping centers, the work of all to be correlated by occasional joint meetings of one or more members from each committee or by the persons who must necessarily be employed to take care of the details of the operations of the organization as a whole. Each sub-committee will be composed of men well qualified to represent the shipbuilder, the shipowner, the ship operator and the Navy, to which will be added representatives from the Army and such other branches of the government as may be concerned—the Department of Commerce always included.

In addition to the three panels described, there will be one sub-committee which will deal with the subject of standardization of things which have to do exclusively with the loading and movement of ships other than the mechanical aspect.

The work of the several sub-committees will be directed by a central committee, the membership of which will be composed of the men designated by Col. Simmons to attend the Washington meeting, augmented from time to time as circumstances may dictate. It will approve all standards before issuance, including the settlement of any differences of opinion within the several sub-committees, define the policies of the organization as a whole and in general exercise executive direction of all major operations.

The chairman was authorized to appoint two special committees, one to acquaint the executive heads of all concerns in the field with the plans of the committee to the end that their hearty support will be assured; the other to survey the range of possibilities for standardization and list all items which, in its opinion, should be acted upon. Pending receipt of its report, it was decided to proceed at once with the appointment of sub-committees to act on those things which have already been thoroughly thrashed out by the British Engineering Standards Association, including such items as pipe threads, bollards, shafting, structural steel, steel for marine boilers and steel forgings and castings.

Million in New Contracts Placed on Great Lakes

THREE contracts for new vessel construction, involving the expenditure of a total estimated at close to a million dollars, have just been awarded to Great Lakes shipyards. They provide for the building of a steel cargo vessel, 334 feet long, by the Toledo Shipbuilding Company, of Toledo, Ohio, for the Huron Transportation Company, of Marine City, Mich., and the construction of two steel Diesel electric freighters, each to be approximately 258 feet long, by the Great Lakes Engineering Works, of Detroit, for the McDougall Terminal Warehouse Company, of Duluth, Minn.; these vessels to be built under the supervision of the American Bureau of Shipping.

Moore Yard Buys Lake Ships; May Convert to Oil

THE Moore Shipbuilding Company, Oakland, Cal., has purchased the cargo steamships *Lake Frances* and *Lake Cayuga*, each of 3,000 deadweight tons, from the Shipping Board. These ships are now at Newport News being fitted out for the voyage to the west coast. It is understood that these vessels will be converted to oil burners and that they will be engaged as lumber carriers.

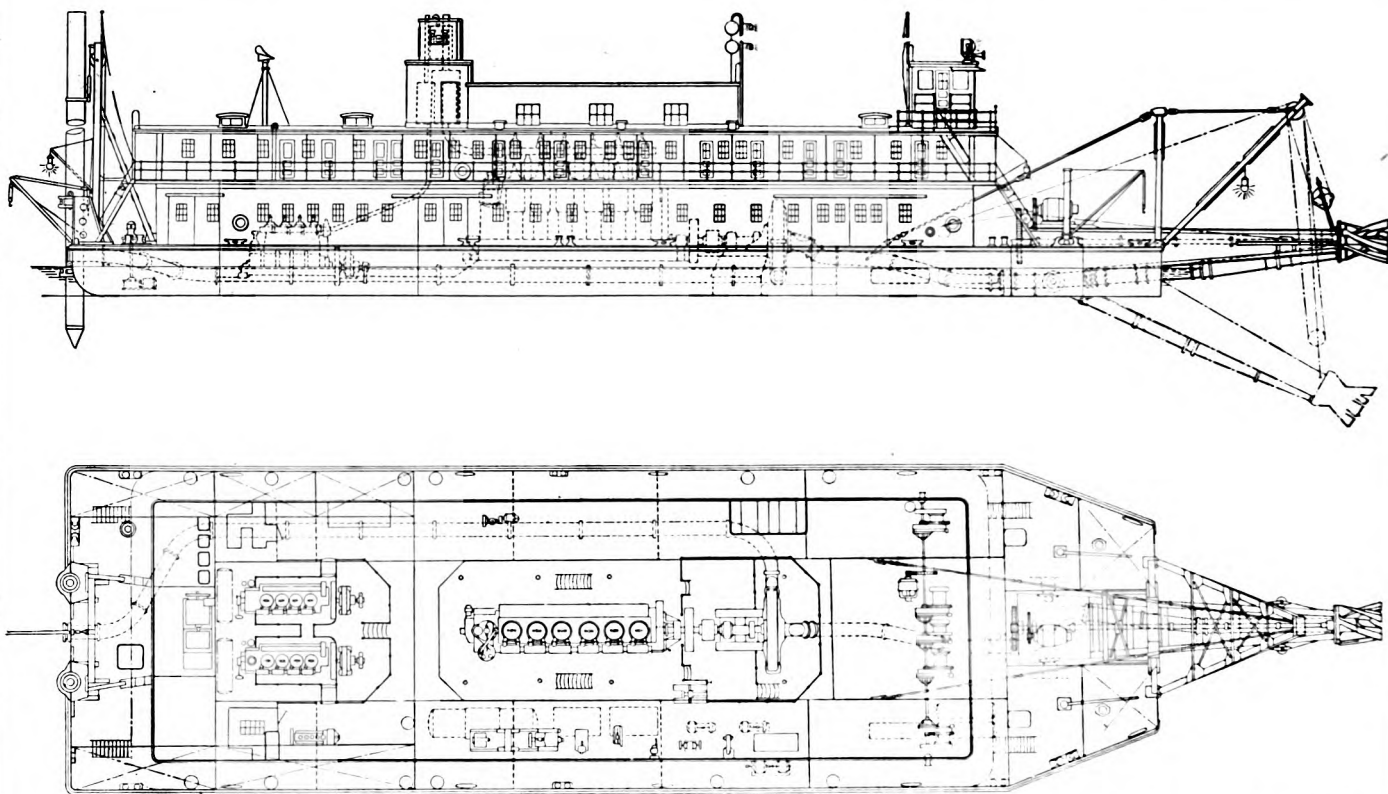
Boiler Contract Placed For Two River Steamers

THE California Navigation Company, of San Francisco, has placed a contract with the Power Specialty Company for four Foster marine boilers to be used on two rivers steamers which the company is to build for the run between San Francisco and Sacramento. Each boiler will have about 3,050 square feet of heating surface and is to be equipped with Foster Superheaters. Other details of the proposed vessels are not yet completed.

Greenbay Yard is Lowest Bidder For Five Steel Barges

THE Greenbay Dry Dock Company, Greenbay, Wis., in submitting a figure of \$72,400, for the construction of five barges and the installations of derricks, submitted the lowest bid at the opening of proposals by United States Engineer Office, Milwaukee, Wis., on December 20. The proposed boats are to be built of steel, 100 feet in length, beam 30 feet and depth 6 feet. Two of the boats are to be equipped with derricks and derrick machinery. The tenders submitted were as follows:

Greenbay Dry Dock Co.....	\$72,400
Penn Bridge Co.....	81,810
Dravo Contracting Co.....	92,040
Manitowoc Shipbuilding Corp.....	95,500
Defoe Boat and Motor Works.....	113,000



Outboard profile and general arrangement plan of 24-inch pipe line dredge to be built for United States Engineer Office, Cincinnati, O. The vessel is to be built of steel, 175 feet molded length, 50 feet molded breadth and 8 feet depth. The main dredging pump will be driven by Diesel engines and she will be fitted with electrically driven equipment. Bids are to be opened January 20, 1923. A detailed description of the vessel and auxiliaries was published in these columns on December 16.

Bids to Be Opened January 5 by Engineer Office, Cincinnati, for Diesel-Electric Pipe Line Dredge

**Proposed Vessel Will Have Molded Length of 175 Feet, Molded Breadth 50 Feet, Built to American Bureau Rules—
Equipment Will be Extensive and Modern.**

SEALD proposals for the construction of one 24-inch Diesel-electric pipe line dredge will be received by the United States District Engineer Office, Cincinnati, Ohio, until January 5, 1923. The vessel is to have a molded length of 175 feet, molded breadth 50 feet and molded depth 8 feet. The dredge and equipment, unless otherwise specified, is to be built to the American Bureau of Shipping Rules. The contracting officer will furnish F. O. B. railroad cars or at wharf at contractor's yard, one dredging pump engine, 1,000 brake horsepower, non-assembled (McIntosh & Seymour type M-6-C-44), type suitable for direct connection to main dredging pump, together with mufflers with heating coils and various other auxiliary material. Bidders are invited to submit alternate proposals on at least three different makes of Diesel engines which will meet the specifications and the boat is to be delivered afloat at Fernbank, O.

EQUIPMENT

The vessel's "A" frame will be about 31 feet 10 inches long and at the upper end

will be fitted five 30-inch sheaves for wire hoisting rope for dredging ladder. There are to be two spuds, each 56 feet 9 inches long, over all, with an outside diameter of 34 inches. They are to be built of 30.6-pound steel plate.

A double-track, 10-ton traveling crane is to be provided and installed between frames 51 and 62, over the dredging pump, with a double-track traveling crane over the pumping engine between frames 31 and 51 and fitted with a 2-ton triplex trolley block, army type.

AUXILIARY ENGINES

Two auxiliary engines and generators shall be furnished and installed as shown on the plans. The engines shall be of the full Diesel, high compression, vertical, multi-cylinder, four-stroke-cycle, single acting, non-reversing, heavy duty type, capable of delivering continuously 150 kilowatts at 250 volts. The engines are to develop at least 225 brake horsepower. Accessories, equipment and spare parts for the auxiliary engines are also to be supplied.

S.S. Lake Sebago To Be Converted For Oil Burning

THE cargo steamship *Lake Sebago* of 3,000 deadweight tons, which has just been purchased by the Oregon Spruce Corporation from the Shipping Board, is to be converted to an oil burner. Specifications covering the job have been sent to both the east and west coasts. It is understood that this company is now dickering with the Shipping Board and will probably purchase more of the same class of ships. The vessel is 252 feet in length, 43 feet 6 inches in beam and draws 18 feet of water. She is fitted with triple expansion engines and cylindrical return tubular boilers.

Liner Roosevelt Repairs Awarded Robins Shipyard

THE Robins Dry Dock & Repair Company was successful bidder for general repair work on the steamship *President Roosevelt*, for the United States Lines, similar in nature to repairs on the *President Harding*, which were as follows: General repairs, minor betterments and providing of steam heat for various sections of the ship, new generators, feed water heaters, distillers and deck alterations. Bids for the work were opened Friday, December 8. The work will cost \$63,000.

Two Standard Oil Contracts Awarded N. Y. H. Plant

THE contract for repairs to the steamship *Charles H. Pratt*, of the Standard Oil Company of New Jersey, has been awarded the New York Harbor Dry Dock Company, as a result of the bids opened on December 14. The tenders submitted were:

New York Harbor.....	\$23,663
Newport News.....	23,735
Morse.....	27,085
Todd.....	33,832

The New York Harbor plant was also awarded the work of making general repairs to the steamship *Baltic*, also of the Standard Oil Company of New Jersey fleet, bids for which were opened December 13. The prices were:

Newport News.....	\$11,754
New York Harbor.....	12,060
Morse.....	15,600
Robins.....	15,909

Three "President" Ships To Be Equipped With Aero Alarm System

The Aero Alarm Company has been awarded the contracts to make extensions of the Aero Alarm System throughout the steamships *President Roosevelt* and *President Harding*, now being reconditioned at Robins Dry Dock & Repair Company, Brooklyn, N. Y.

The company has also been awarded, through the Seattle office of the Todd Shipyards Corporation, the contract for making extensions of the Aero Alarm System on the *President Harrison* now lying at San Francisco.

Radio Installed on Morgan Liners

Radio sets have been installed on the passenger steamships *Momus*, *Comus* and *Creole*, the three ships in the Morgan Line service between New York and New Orleans, according to an announcement made by L. J. Spence, director of traffic of the Southern Pacific Lines.

"There is nothing more modern than radio," said Mr. Spence, "and these installations are an earnest of the desire and intention of the officers of the line to keep the service strictly up to date in every respect."

Greenbay Dry Dock Company Low Bidder for Construction of Ten 100-Foot Steel Barges

THE Greenbay Dry Dock Company, of Greenbay, Wis., with a total price of \$107,740 or \$10,774 for each boat, was the low bidder for the construction of ten steel barges, at the opening of tenders by

American Ships Must Pay Fifty Percent Tax On Repairs Made In Foreign Ports Under New Ruling

REGULATIONS governing the carrying out of repair work on American vessels in foreign ports and providing for the payment of a fifty per cent tax for such work, except where the vessel is compelled by stress of weather or other casualty to put into a foreign harbor for repairs or purchase of equipments, have been issued by the Treasury Department, United States Customs Service. The provisions of the act are as follows:

TREASURY DEPARTMENT
United States Customs Service
New York, N. Y., December 4, 1922
TO STEAMSHIP OWNERS, COMPANIES, AGENTS, AND
OTHERS CONCERNED.

Your attention is invited to Section 466, Act of September 21, 1922, amending Sections 3114 and 3115 of the Revised Statutes which provides that "the equipments, or any part thereof, including boats, purchased for, or the repair parts or materials to be used, or the expenses of repairs made in a foreign country upon a vessel documented under the laws of the United States to engage in the foreign or coasting trade, or a vessel intended to be employed in such trade, shall, on the first arrival of such vessel in any port of the United States, be liable to entry and the payment of an ad valorem duty of 50 per centum on the cost thereof, in such foreign country; and if the owner or master of such vessel shall wilfully and knowingly neglect or fail to report, make entry, and pay duties as herein required, such vessel, with her tackle, apparel and furniture, shall be seized and forfeited."

If the owner, or master of such vessel, however, furnishes good and sufficient evidence that such vessel, while in the regular course of her voyage, was compelled, by stress of weather or other casualty, to put into such foreign port and purchase such equipments, or make such repairs, to secure the safety of the vessel to enable her to reach her port of destination, then the Secretary of the Treasury is authorized to remit or refund such duties, and such vessel shall not be liable to forfeiture, and no license or enrollment and license, or renewal of either, shall hereafter be issued to any

such vessel until the collector to whom application is made for the same shall be satisfied, from the oath of the owner or master, that all such equipments and repairs made within the year immediately preceding such application have been duly accounted for under the provisions of this and the preceding sections, and the duties accruing thereon duly paid; and if such owner or master shall refuse to take such oath, or take it falsely, the vessel shall be seized and forfeited."

Equipments. The term "equipment" includes portable articles necessary or appropriate for the navigation, operation, or maintenance of a vessel, such as rigging, sails, anchors, chains, cables, tackle, boats, repair parts, life-saving apparatus, nautical instruments, signal lights, lamps, furniture, carpets, table linen, table ware, bedding, arms, munitions, and articles of a similar nature, but not such articles as are permanently incorporated in or permanently attached to its hull or propelling machinery and does not constitute consumable supplies.

Sea Stores. Sea stores embrace all articles for the use and consumption of the passengers and crew of a ship upon its voyage and all commodities which are consumed in their use.

(1) The Department advises that articles such as soda, kerosene, varnish, turpentine, etc., which are consumed in their use, are not subject to duty.

(2) Articles which are purchased for repair purposes on a vessel, such as paint, for example, though coming under the head of sea stores, are subject to duty.

Ship's Stores and Equipment. Ship's stores and equipment are held by the Department to be identical terms.

Repairs and Materials. Repairs made at the port of destination, when such repairs are due to stress of weather during the voyage, are not exempt from duty. Materials drawn from the vessel's equipment or sea stores and used for repairs are dutiable.

Labor. If the labor is performed by other than the ship's complement, charges for labor should be included in the value of such repairs. If the labor is performed by members of the ship's complement and an additional compensation is paid them for such repair work, such additional compensation constitutes a part of the cost of the repairs and is dutiable.

Cleaning. Cleaning and scrubbing of parts of the ship's equipment, such as stoves, window curtains, etc., does not constitute repairs and is not subject to duty.

Entry. Consumption form of the entry will be used and it is very essential to the expeditious handling of repairs under Section 466 that a statement of the cost of repairs made abroad be filed at the time of entry. The consumption entry should be filed and the duties, if any, paid or secured to be paid, immediately after entry of the vessel.

Protest. If dissatisfied with the decision of the collector as to the rate and amount of duties assessed, the importer or owner, or his agent, may file a written protest as provided for in Section 514 of the Tariff Act of 1922, and have the question or questions determined by the Board of United States General Appraisers.

Prompt and cheerful compliance with these regulations is respectfully solicited.
(Signed) H. C. STUART, Acting Collector.

Greenbay Dry Dock Co.....	Greenbay, Wis.....	\$10,774.00
Dubuque Boat & Boiler Works.....	Dubuque, Iowa.....	11,200.00
Rock Island Bridge & Iron Works.....	Rock Island, Ill.....	12,900.00
Riter-Conley Co.....	Pittsburgh, Pa.....	13,110.00
Nashville Bridge Co.....	Nashville, Tenn.....	13,270.00
Independent Bridge Co.....	Pittsburgh, Pa.....	13,590.00
Dravo Contracting Co.....	Pittsburgh, Pa.....	13,850.00
Penn Bridge Co.....	Beaver Falls, Pa.....	13,880.00
Greiling Brothers Co.....	Greenbay, Wis.....	14,700.00
Midland Barge Co.....	Midland, Pa.....	15,000.00
American Bridge Co.....	Pittsburgh, Pa.....	15,850.00
Midwest Boat & Barge Co.....	Grafton, Ill.....	15,998.60
Lakeside Bridge & Steel Co.....	North Milwaukee, Wis.....	20,470.00

Among the Steamship Operators

Beginning this month, the Garland Steamship Corporation will add seven modern steamers, totaling more than 59,000 tons, to their coast to coast service via the Panama Canal. There will be sailings every two weeks both east and west bound, the ports of call being New York, Baltimore and Norfolk on the Atlantic and Los Angeles, San Francisco, Seattle and Portland on the Pacific, the vessels maintaining the sailings as to ports in the order named.

Several reductions and changes in prevailing freight rates have been authorized by the Continental Freight Conference. Among them were the general cargo rate to Antwerp and Rotterdam, which was reduced from 75 cents and 40 cents a hundred pounds to 70 cents and 35 cents. To Hamburg and Bremen the general cargo rate was lowered from 82½ cents and 45 cents to 75 cents and 37½ cents.

November marked the inauguration of a semi-monthly service from San Francisco and Los Angeles to the West Coast of Mexico with the sailing of the German steel motorship *Principio*, a twin screw vessel of 1,000 tons deadweight, owned by the United Fruit Distributors, Inc., of Los Angeles. Refrigerator equipment has been placed on the vessel for the handling of bananas, which will be the main cargo northbound. The vessel was purchased recently in Hamburg and the possibilities are that her registry may be changed.

Gulf shipyards have reduced drydocking rates from 20 cents a ton for the first day and 15 cents thereafter to 16 and 14 cents.

Vessels of the Commercial Pacific Line in the coast to coast trade now call at Norfolk for cargo. Hasler & Co. are handling the ships there. The Commercial Line is an old established concern, now operating out of Baltimore, New York, Philadelphia, Los Angeles, San Francisco, Portland, Ore., Vancouver and Seattle. Including the Isthmian Line, which has had two ships at Norfolk recently, the number of coast-to-coast lines giving service at Hampton Roads will be six.

Sailings from Boston in the London, Hull and Leith service of the Oriole Steamship Lines will in the future, include a call at Dundee, Scotland, to discharge and load freight. The North Atlantic & Western Steamship Company of Boston is agent for the operating company.

Sailings from Boston to the Far East have been arranged by the Toyo Kisen Kaisha, Japanese Steamship Company, and the service will be permanent, if conditions warrant.

The Baltimore Steamship Company has decided to add a passenger feature to its line to Porto Rico. This step has been taken because of the growing business relations between Baltimore and the West Indies. The *Governor John Lind*, upon its arrival at Baltimore from San Juan, went to the plant of the Baltimore Dry Docks to be fitted with 16 staterooms for passengers. It is expected that the running mate of the *Lind*, the *Major Wheeler*, will also be re-conditioned in a similar manner.

W. J. Love, vice-president and general manager of the United States Shipping Board Emergency Fleet Corporation, in charge of traffic, has announced the inauguration of a new line of Shipping Board passenger steamers to be operated from Pacific Coast ports to the east coast of

South America, via the Panama Canal. The new service will be managed by Swayne & Hoyt, of San Francisco, as agents for the Board, and, in addition to the three cargo vessels now allocated to them by the Fleet Corporation, they will operate the fast passenger steamers *President Hayes*, *President Harrison* and the *Susquehanna*. In addition to passenger accommodations, the last named steamships are equipped for miscellaneous and refrigerator cargoes. The ports of call will be Seattle, Wash.; Portland, Ore.; San Francisco, Cal.; Panama Canal; Porto Rico; Rio de Janeiro; Montevideo and Buenos Aires, on southbound trips, and in addition to these ports, the vessels will stop at other east coast South American ports on the northbound trip for coffee. This line will open a new territory for Pacific Coast merchants and products. It will tend to develop the fruit trade of the northwest with the east coast of South America, particularly Brazil, where a marked demand is noted for American apples. It is proposed to install a service whereby sailings will be made every three weeks in each direction. Business men and tourists who desire to visit the west coast of South America can take this new line to the Panama Canal and then transfer to an American vessel running to ports on the west coast to South America. It will also give direct communication with Porto Rico and from Porto Rico to all east coast ports.

Effective in November, Mrs. E. R. Clotworthy was appointed director of steamer and passenger service, in charge of service on steamers and local passenger business, between Baltimore and Norfolk, including solicitation and advertising in connection therewith, reporting to W. L. Seddon, of the Baltimore Steam Packet Company.

Following meetings of the North Atlantic Conference in New York and Brussels, the steamship lines agreed to make certain reductions in the first class fares on all Atlantic lines except those going to the Mediterranean. There will be very small reductions on liners such as the *Majestic* and *Aquitania*, due to heavy operating expenses, and it will be very little more than 5 per cent on the Liverpool ships like the *Baltic* and *Carnania*. The chief reduction will be in the minimum first cabin rates of the older ships like the Red Star liners *Kroonland* and *Finland* and the Holland-American liners, *Noordam* and *Ryndam*. This will be more than 12 percent, considering speed. There will be no reduction in the second and third class fares on the Atlantic lines.

The Far East Steamship Company, 78 Broad Street, New York, started a service late in December from New York to Hong Kong, Kobe and other Far East ports. One steamer, the *Culgoa*, has been acquired under the American flag and negotiations are under way with Chinese interests for another vessel.

The Shipping Board has announced the sale of two tankers and one steel cargo vessel. The tankers are the *Utacarbon* and the *Cathwood*, both 10,078 deadweight and 7,076 gross tons, sold to the Union Oil Company of Los Angeles, while the steel cargo vessel is the *Delrosa*, 5,125 deadweight tons and 3,474 gross tons, sold to the Alaska Steamship Company of Seattle, Wash.

The East Coast South American Conference met recently and reduced the rate on

paint to Montevideo and Rio de Janeiro from \$20 to \$16 a ton.

A successful trial test was made of the steel steamship *State of Maryland*, under construction at the Pusey & Jones Company for the Old Bay Line. A speed of 18.6 knots was attained. The vessel is a sister ship of the *State of Virginia*, launched some months ago by the Pusey & Jones Company. Both vessels will be used on Chesapeake Bay.

The Three Star Line has arranged for a resumption of its full service to North African ports, Marseilles and Genoa.

The steamer *Fred G. Hartwell*, building for the Franklin Steamship Company, H. K. Oakes, manager, was successfully launched at Lorain, O. The *Hartwell*, which will be completed this month, will be 617 feet overall, 596 feet keel, 64 feet beam and 33 feet deep. She will have a triple expansion engine and steam will be furnished by three Scotch boilers, 14 feet in diameter and 11 feet long.

For the purpose of establishing the fastest and best service between Seattle and the Orient, the five large trans-Pacific liners, operated by the Admiral Oriental Line, were placed on a 12-day schedule beginning December 9. The ships formerly sailed every two weeks, remaining in Seattle, the home port, for 18 days.

Business Notes

The Ingersoll-Rand Company and the A. S. Cameron Steam Pump Works announce the opening of a branch office at 718 Ellicott Square Building, Buffalo, N. Y. This new office is equipped to render full service to those interested in air, gas and ammonia compressors, vacuum pumps, turbo blowers and compressors, condensers, oil and gas engines, pneumatic tools, rock drills, centrifugal and direct-acting pumps and other products manufactured by these companies.

It is announced from Cleveland, Ohio, that the following companies are now doing business under the name of The Columbia Steamship Company, as a result of consolidation: The Hubbard Steamship Company, Montreal Transit Company, Castile Transit Company, Miller Transit Company, Hanna Transit Company, Norton Transit Company, Ft. Henry Transit Company, Ottawa Transit Company, Bristol Transit Company and Yosemite Transit Company.

The Wilson Welder & Metals Company is now represented exclusively in Maryland, Virginia and the District of Columbia, by the Alexander Milburn Company of Baltimore. A large stock of color-tipt welding metals and plastic-arc welding machines is available at this point for distribution throughout the territory and a complete demonstration plant is in operation.

Mr. A. E. Jones, sales engineer in the New York office of the Terry Steam Turbine Company, has accepted a position with W. B. Connor, Inc., 90 West Street, New York City, in a similar capacity. Mr. Jones began his new duties January 1, 1923.

Mr. A. A. Heller has taken over the management of the International Oxygen Company in place of Mr. L. W. Hench, secretary and general manager, resigned.

Marine Construction News of the Month

Ship Contracts—New Ship Concerns and Shipyard Improvements—Terminal Projects—Government Contracts

SHIPS AND SHIPBUILDING

Steamer Overhauled, Portland, Ore.—Steamer Wawona was placed on drydock at Portland for overhauling.

Tug Drydocked, Mobile, Ala.—The Alabama Dry Dock Company replaced broken propeller wheel on tug Hukey.

Repairs to Boiler, Oakland, Cal.—Santa Fe ferryboat San Pablo went to the Moore yards for repairs to her boilers.

Motorship Drydocked, Portland, Ore.—Motorship La Merced was lifted at the port drydock plant to be overhauled.

Tug Repaired, Mobile, Ala.—Tug James Dougherty went to Todd repair plant, Mobile, for repairs and general overhauling.

Drydocking Contract, Seattle, Wash.—The Todd Drydocks have received the contract for drydocking the Remus for repairs.

Steamers Drydocked, Portland, Ore.—Steamers West O' Rowa and Wawalong went on drydock at Portland for overhauling.

Schooner Repairs, Philadelphia, Pa.—The American schooner Mabel Gale went to Cramps' Shipyard for miscellaneous repairs.

Repairs to Plates, Superior, Wis.—Steamer Cayuga went to Superior to be drydocked for repairs to eighteen damaged plates.

Government Dredge Repaired, Portland, Ore.—Government dredge Col. P. S. Michie went to Portland to be drydocked for repairs.

Steamer Repaired, Brooklyn, N. Y.—Steamer Susquehanna was awarded the Atlantic Basin Iron Works for repairs at \$15,290.

Repairs and Overhauling, Seattle, Wash.—Admiral liner H. F. Alexander was placed on drydock for minor repairs and overhauling.

Tanker Drydocked, Chester, Pa.—The tanker J. M. Pew, of the Sun Oil Company's fleet, went into drydock at the Sun Shipyards.

Schooner Repairs, Orange, Tex.—The schooner Thelma has been shifted to the Southern Dry Dock yard to be hauled out for repairs.

Coast Guard Cutter Repaired, Fore River, Mass.—Coast Guard cutter Tampa went to the Fore River plant to undergo necessary repairs.

Miscellaneous Repairs, Chester, Pa.—The Shipping Board steamship West Inskip went to the Sun Shipyards for miscellaneous repairs.

Dredge Drydocked, Portland, Ore.—Dredge Portland, wrecked in collision, was towed to drydock to be salvaged of machinery and equipment.

Steamer Drydocked, San Francisco, Cal.—General Petroleum Company's steamer Hambro has been placed in drydock to be reconditioned.

Contract Awarded, Brooklyn, N. Y.—Alderton Dry Dock Company was awarded the contract for repairs to the steamship West Lashaway; price \$4,800.

Repair and Painting, Philadelphia, Pa.—Southern Steamship Company's vessel Algiers went to Cramp's yard to be drydocked for repairs and painting.

Overhauling of Lightship Relief, Winslow.—Lightship Relief No. 92 has been sent to Winslow to undergo overhauling, repairing and annual inspection.

Towboat Inspection, Pittsburgh, Pa.—Towboat Twilight, of the Rogers Sand Company fleet, underwent boiler repairs and was inspected shortly after.

Contract Awarded, Winslow.—The contract for repairing the motorship Anvil has been let to the Winslow Marine Railway and Shipbuilding Company.

Steamship Reconditioning, Brooklyn, N. Y.—The Morse Dry Dock & Repair Company was successful bidder, at \$168,270, for reconditioning steamship Reliance.

Steamer Drydocked, Seattle, Wash.—The steamship Memnon of the General Steamship Corporation's South American service has been drydocked at Seattle.

General Repairs, Baltimore, Md.—The Maryland Dry Dock Company received the contract for general repairs and painting on the Norwegian steamship Tajana.

Barges Repaired, Mobile, Ala.—Mississippi-Warrior Service barges No. 103, 205 and 210 were awarded to the Alabama Dry Dock Company for repairs.

Miscellaneous Repairs, Philadelphia, Pa.—The United States Army tug Vidette has gone to Cramps yard for miscellaneous repairs as a result of a collision.

Steamer Drydocked, Mobile, Ala.—Todd plant, Mobile, was awarded the contract to drydock and make general repairs to the Waterman steamer Clavarack.

Alteration Job, Oakland, Cal.—Contract for extensive alterations on the Associated Oil tanker Kewanee was awarded to Moore Shipbuilding Company, at \$18,900.

Calking of Deck, San Francisco, Cal.—Crowley Shipyard was awarded the contract, as low bidder, for work of calking main deck of the steamer Admiral Dewey.

Repairs to Steamer, Toledo, Ohio.—Steamer Arc-turus, damaged in collision in the Detroit River, has gone to the yard of the Toledo Shipbuilding Company for repairs.

Contract Awarded, Staten Island, N. Y.—The New York Harbor Dry Dock Company has been awarded repairs to the Shipping Board steamship Waukegan on a bid of \$7,570.

Contract Awarded, Oakland, Cal.—The Moore Shipbuilding Company was awarded the contract for drydocking and other work on the Pacific Mail steamer Point Judith.

Steamer Drydocked, Oakland, Cal.—China Mail steamer Nanking went to the Moore yard to be drydocked to have new tailshaft installed and to be generally overhauled.

Repairs to Keel, Eagle Harbor, Wash.—Steamship Anyox, of the fleet of the Coastwise Steamship and Barge Company, has been shifted to Eagle Harbor for repairs to her keel.

Schooner Drydocked, Savannah, Ga.—Sally Wrenn has been placed on drydock at the Wilkinson Marine Railway and Dry Dock Company's plant to undergo survey and minor repairs.

Overhauling of Ship, Seattle, Wash.—The trans-pacific liner President Jackson went to Todd Dry Docks for a thorough overhauling and to have her keel scraped and painted.

New Tail Shaft, Brooklyn, N. Y.—Work of supplying and machining new tail shaft for the steamship Munamar was awarded to the Robins Plant of the Todd Shipyards Corporation.

Repairs to Steamship, Staten Island, N. Y.—Contract for repairs to steamship Swiftscoot has been awarded to the Staten Island Shipbuilding Company on tender of \$9,350 and 9 days.

Proposed Boat, Cincinnati, O.—Captain Gordon Greene, of Cincinnati, contemplates building new stern wheel, all steel, river steamer, 170 feet long and of the Mississippi River type.

\$6,500,000 Repair Work, New York.—\$6,500,000 worth of ship reconditioning work will be done early this year on the steamships Agamemnon, Mount Vernon, President Grant and America.

Two Shipping Board Contracts Awarded, Brooklyn, N. Y.—Shipping Board awarded steamship Zarembo to the Alderton Yards at \$2,000, and the Half Moon to the Crystal Iron Works, at \$1,043.

Liner Overhauled, San Francisco, Cal.—Pacific Mail liner President Lincoln went to the Bethlehem plant for general overhauling. All machinery and boilers were taken down and inspected.

General Overhauling, Newport News, Va.—The Merchants and Miners' Transportation Company's passenger ship Merrimack has gone to Newport News to be drydocked for general overhauling.

Contract Awarded, San Francisco, Cal.—The Eureka Boiler Works was awarded the contract for retubing work on the Matson motorship Annie Johnson and other minor adjustments on the vessel.

Contract Awarded, Brooklyn, N. Y.—Robins Dry Dock & Repair Company was awarded the contract for repair work on the steamship President Roosevelt, for the United States Lines. Price \$63,000.

Contract Awarded, Brooklyn, N. Y.—The Foreign Transport & Mercantile Corporation of New York awarded the contract for repairs to steamship Manitowoc to Alderton Dry Docks Company at price of \$3,797.

Contract Awarded.—The Bethlehem Shipbuilding Corporation has been awarded the contract by the United States Shipping Board to repair the steamship West Loquassak, cost to be in excess of \$10,000.

Contract Awarded, Brooklyn, N. Y.—Robins Dry Dock & Repair Company received the contract for reconditioning the steamship President Harding, the work providing for general repairs, minor betterments, etc.

Transport Reconditioning, San Francisco, Cal.—Transport Logan went to Bethlehem Yards, San Francisco, for extensive alterations on vessel's passenger accommodations and life-saving equipment. Price \$16,989.

Contract Awarded, Brooklyn, N. Y.—The Martha Washington, purchased by the Cosulich Line from the Shipping Board, has been taken to the yard of the Robins Drydock and Repair Company for a thorough reconditioning.

Reconditioning Work, Staten Island, N. Y.—The Staten Island Shipbuilding Company was awarded the contract for reconditioning work on the steamship Munamar, of the Munson Line, including about 400 feet of seam calking.

Aero Alarm System Installation.—The Aero Alarm Company has been awarded contracts to make extensions of the Aero Alarm System throughout the steamships President Harding, President Roosevelt and the President Harrison.

Boiler Installed on Government Tug, Portland, Ore.—Government tug Wilson, controlled by Washington district, corps of engineers, U. S. A., went to Portland to have new boiler installed, at plant of Willamette Iron & Steel Works.

Repairs, Oakland, Cal.—Liner President Taft went to Moore Shipyard for repairs to her machinery in excess of a cost of \$25,000. Work included retubing of her boilers and repairs to her condensers. Other work was on the main engines.

Reconditioning Steamer, West Coast.—A large sum will be expended in reconditioning the transport Sherman, purchased by the Los Angeles Steamship Company for \$60,000, for the Los Angeles-Honolulu run, to replace the City of Honolulu.

Repairs to British Schooner, Philadelphia, Pa.—Philadelphia Ship Repair Company was awarded a contract by T. H. Warren & Company to repair several bow plates and beams in the British schooner James William, damaged in collision.

Shipping Board Contracts, Maryland.—The Shipping Board awarded steamer Homestead to H. E.

Crook Company, at \$2,392, for repairs; and the steamship Chebaulip to the Maryland Dry Docks Company, at \$594, for docking for survey.

Steel Tug Hull, Midland, Pa.—Captain Oscar F. Barrett, of the Barrett Line, Cincinnati, O., let a contract to the Midland Barge Company, Midland, for the construction of a steel hull for a stern wheel towboat 175 feet long by 38 feet beam.

Two Contracts Awarded, Staten Island, N. Y.—Contracts for repairs to the steamship Charles H. Pratt and the steamship Baltic, both of the Standard Oil of New Jersey, were awarded the New York Harbor Dry Dock Company. Prices \$23,063 and \$12,060, respectively.

Contract Awarded, Mobile, Ala.—The Alabama Dry Dock & Shipbuilding Company has been awarded the contract for extensive repairs to the 1,133 net ton steam freighter Yumuri, of the Ward Line. The work includes extensive repairs to machinery and a great deal of hull work.

Contract Awarded, Mobile, Ala.—The United Fruit Company awarded a contract to the Todd Shipbuilding & Dry Dock Company, Mobile, for repairs, involving approximately \$50,000, to the steamship San Mateo. Work consisted of conversion from coal to oil burning and general repairs.

Contracts Awarded, Staten Island, New York.—The New York Harbor Dry Dock Company was awarded three repair contracts on Shipping Board vessels; two on the West Gotomska and the other on the steamship Scottsburg. Prices were respectively \$2,620, \$2,648 and \$1,343.

Two New Ferryboats, Philadelphia, Pa.—Pusey & Jones Shipbuilding Company, of Wilmington, Del., has been awarded a contract to build two all-steel ferryboats for the Philadelphia & Reading Railway. They will be 200 feet long, and will ply between Philadelphia and Camden and will be the fastest ferryboats on the Delaware.

Jahncke Repairs, New Orleans, La.—Contracts recently awarded the Jahncke Dry Dock Company are as follows: Steamship Salaam, to undergo periodical surveys and minor repairs; Vaccaro Brothers' tanker Caloria, overhauled; Standard Oil tug Bonita, overhauled; and Magnolia Petroleum Company's barge Chagres, overhauled.

Extensive Overhauling, Eagle Harbor.—The motorship Coolcha, owned by the Pacific Freighters Company, went on the ways of the Winslow Marine Railway & Shipbuilding Company, Eagle Harbor, to undergo an extensive overhauling. The schooner Vancouver and the steamship Pacifico also went on the ways of the Winslow Marine Railway & Shipbuilding Company.

Miscellaneous Repairs, Mobile, Ala.—The Texas Company steamer New Jersey has been placed on the docks of the Alabama Dry Dock & Shipbuilding Company for repairs. The work included: renewing and hardening approximately one thousand rivets scattered about the shell; tanks; rudder arms and stern frame; number of plates faired and two coats of paint below light load line.

Construction of Tank Barge, Chester, Pa.—The Sun Shipbuilding Company received the contract for the construction of a twin screw Diesel propelled steel bulk oil barge for Standard Transportation Company of New York, subsidiary of the Standard Oil Company. Approximate total cost \$300,000. Dimensions, 254 feet length over all, 37 feet 6 inches molded beam and 14 feet molded depth.

Motor Schooner Drydocked, Mobile, Ala.—The Alabama Dry Dock Company was awarded the contract for repairs to the motor schooner Esperanza. The work consisted of the following: Cleaning, painting, repairs to damaged planking on port side forward, removing three sections of keel, renewing keel shoe, calking of vessel from keel to covering board, lifting and tightening of rudder, and painting bottom with copper paint.

Steamer Construction Contract Award, Bethlehem, Pa.—The contract for the construction of a new paddle wheel steamer for the Hudson River Day Line was awarded the Bethlehem Shipbuilding Corporation on a bid of \$742,140. Vessel was designed by J. W. Millard & Brother, naval architects, 17 State street, New York City. Dimensions are: over all length 338 feet, extreme breadth 76 feet and depth molded to main deck at side of guard 18 feet 8 inches.

Yacht Contract Held Up for Present, New York.—It is learned that the tenders received for the construction of a steel auxiliary schooner yacht, having a length of 125 feet and propelled by a 200 to 250

horsepower oil engine, for William P. Adams, of Chicago, have been set aside, the contract having been held up for the present at least. It is understood that the bids ranged from \$175,000 to \$375,000. The vessel was designed by Theodore E. Ferris, naval architect and marine engineer, 30 Church street, New York City, N. Y.

Alabama Dry Dock Work, Mobile, Ala.—Following contracts were awarded the Alabama Dry Dock & Shipbuilding Company: Texas Company's motor vessel Solitaire, to have bottom examined, both tail shafts drawn for inspection, strut bearings re-wooded, shafts replaced, minor leaks in way of engine room calked and made tight, pitted places on stern plates on both port and starboard sides built up by electric welding and to be painted; S. S. San Antonio, replacing of tail shaft and propeller; barge Oriole, voyage repairs.

Steamers Repaired, Mobile, Ala.—The following steamships have been awarded to the Alabama Dry Dock & Shipbuilding Company: stern wheel river steamer Volcano, operated in Mississippi-Warrior Service, for calking bottom, repairs to port rudder, repairs to machinery heater-pipe system, iron work on rudders, repair work about the cabin and installation of new radio room; Shipping Board steamship Braddock, for renewing several hundred leaky rivets in her bottom and considerable bulkhead repairs; Lake Gunn, for general repairs.

SHIPYARDS AND DRYDOCKS

Yard and Plant Improvement, Beaumont, Tex.—The Pennsylvania Shipyards, Inc., of Beaumont, Texas, formerly the Beaumont Shipbuilding Company, have completed their improvement to the old plant. They dredged a 28-foot channel to their docks and raised the fill about 6 feet to bulkheads, in all covering about 10 acres. The improvements include newly arranged and well equipped machine shop, plate shop, blacksmith and wood working shop. The 3,000-ton railway is complete and in operation.

PORT IMPROVEMENTS

Contract Awarded, New Haven, Conn.—New England Steamship Company, Bridge street, will rebuild dock on Bridge street, wood and steel. Price \$30,000.

Channel Improvements, Liberty, Tex.—District Engineer of Galveston is making plans for channel improvements from Liberty to mouth of Trinity River.

Terminals, Oakland, Cal.—The Southern Pacific Company, 65 Market street, San Francisco, Cal., has purchased 300 acres of waterfront land at Oakland, on which they will construct an extensive port terminal.

Contract Awarded, Kincardine, Ont.—Key Brothers, Kincardine, was awarded the contract to rebuild piers, stone and cement work, by the Department of Public Works, Ottawa, Canada. Engineer's estimate \$26,000.

Grain Elevator, Goderich, Ont.—Goderich Elevator & Transit Company, 85 Horton street, London, is having plans prepared for reinforced concrete grain elevator, along harbor; 1,000,000 bushels capacity; price \$250,000. Private plans.

New Dock, New Orleans, La.—Early next spring the Board of Port Commissioners of New Orleans will spend \$1,500,000 on the construction of a 2,000-foot modern shedded pier on the Industrial Canal, according to plans now being prepared.

Dock, Vancouver, B. C.—S. E. Junkins & Company, 837 Hastings street W., was awarded the contract for building a new dock 800 feet long, 333 feet wide, timber on creosoted piles or concrete slab on concrete piles (7,000,000 feet) by Canadian Pacific Railway, Seymour street. Price \$2,000,000.

Seawall, New Orleans, La.—New Orleans Levee Board, New Courthouse Building, plans 26,000 feet seawall from West End to Seabright, reclaiming 48,475,000 square feet of ground, of which 26,000,000 square feet will be devoted to public use, 4,495,000 square feet for streets and sidewalks, leaving

17,981,000 square feet for suburban development, including 70,200 cubic yards of reinforced concrete \$1,400,000, 560,000 feet creosoted piling \$252,000, lumber \$175,000, 750,000 pounds of iron and hardware \$22,500, and 16,282,500 cubic yards of hydraulic fill \$975,000.

New Pier, Hoboken, N. J.—Plans have been prepared for building of a new steel and concrete pier in Hoboken for the accommodation of the Leviathan, under supervision of Admiral W. S. Benson, Shipping Board Commissioner. Plans call for a double deck structure about 1,200 feet long and to cost between \$3,000,000 and \$4,000,000.

New Pier, Hoboken, N. J.—The contract for removing Piers 5 and 6 to make room for the new pier for the Leviathan was awarded to the Robins-Ripley Company, of 50 Church street, which estimates the cost approximately \$35,000. Dredging the slip to a depth of 45 feet will be done by the Morris & Cummings Dredging Company, of 17 State street, New York, for about \$60,000.

Harbor Improvements, Norfolk, Va.—United States engineer for rivers and harbors wants \$500,000 for new work on the Norfolk harbor during the fiscal year ending June 30, 1923, according to the engineer's report filed with Congress, December. The report shows that the completion and widening of the forty-foot channel from Hampton Roads to the Belt Line bridge will take the \$500,000 asked for. Other needed improvements asked for are: the inland waterway from Norfolk to Beaufort, \$500,000; dredging the forty-foot channel in Thimble Shoals from Hampton Roads to the sea, \$74,560; keeping of the channel of the James River at a minimum depth of eighteen feet and from 100 to 200 feet wide, \$40,000; improvement during the coming fiscal year in the Pagan River, \$2,000; and work on the Nansemond River to make it more navigable, \$42,000. This report goes into detail as to the waterborne commerce of Hampton Roads and its tributaries. The report goes into the history of harbor development here, also, and carries the figures all the way down the coast. It shows Hampton Roads as substantially a commercial leader. The total improvements asked for in this report amount to \$1,123,560, which includes \$500,000 for the Norfolk channel widening, the \$50,000 for maintenance work, and the \$74,560 for widening the channel at Thimble Shoals.

NEW INCORPORATIONS

The Royal Barge Line, \$750,000, incorporated in Delaware, to do business in barges.

The Coastwise Oil and Transport Company, Philadelphia, capital \$3,000,000, incorporated under Delaware laws.

The Motorship Transportation Company, capital \$10,000,000, incorporated in California, to carry fruits between Pacific and Atlantic ports.

The Sagadahoc Steamship Corporation, capital \$300,000, chartered at Albany. Incorporators: E. E. Baldwin, F. V. Barnes and R. F. Weeks.

The Bimini Steamship Corporation, capital of \$100,000, chartered under Delaware laws by John McGovern, E. Brouse and E. Levison, of New York.

King Boat Works, West Highlands, N. J., \$200,000, incorporated in New Jersey. Incorporators: George C. King, Harry N. Johnson, Leslie J. King and Stewart B. King.

Moore & McCormack Company have incorporated under Delaware laws for \$100,000 each the Commercial Traveler Steamship Company, Ltd., and the Commercial Spirit Steamship Company, Ltd.

GOVERNMENT WORK

Cranes, Puget Sound, Wash.—Specification 4755, Bureau of Yards and Docks, Navy Department, Washington, D. C., plans to purchase electric elevator cranes.

Extension to Dock, Boston, Mass.—Specification 5,753.—Bureau of Yards and Docks, Navy Department, Washington, D. C., plans extension to Naval drydock at Boston.

Contract Awarded, Beaver Falls, Pa.—The contract for the construction of three steel dump scows, bids for which were opened November 7, by the United States Engineer Office, Buffalo, N. Y., has been awarded the Penn Bridge Company, Beaver Falls, Pa. The company's price was \$92,120.

Contract Awarded, Gloucester, Mass.—Department of Public Works, State House, Boston, has awarded the contract to construct 1,008-foot granite faced concrete seawall, 47-foot concrete seawall, 76-foot granite seawall at Gloucester, to Bay State Dredging Company, 62 Condon street, East Boston (Boston P. O.); price \$54,630.

BUSINESS NOTES

Mr. A. A. Heller has taken over the management of the International Oxygen Company in place of Mr. L. W. Hench, secretary and general manager, resigned.

Mr. George Macnoe, Manager of the Boston Office of the W. B. Connor, Inc., has been recalled to New York to take charge of the Contractors' Sales Department, handling heating and pumping equipment.

Mr. A. E. Jones, sales engineer in the New York office of the Terry Steam Turbine Company, has accepted a position with W. B. Connor, Inc., 90 West street, New York City, in a similar capacity. Mr. Jones assumed his new duties January 1, 1923.

The Wilson Welder & Metals Company is now represented exclusively in Maryland, Virginia and the District of Columbia, by the Alexander Milburn Company of Baltimore. A large stock of color-tipt welding metals and plastic-arc welding machines is available at this point for distribution throughout the territory and a complete demonstration plant is in operation.

The Roller-Smith Company, 233 Broadway, New York, N. Y., announces the appointment of the Electric Material Company as its agent in the State of Washington and parts of Oregon and Idaho. The Electric Material Company has recently opened an office in the Hinckley Building, Seattle, and will handle the Roller-Smith Company's lines of electrical instruments, circuit breakers and radio apparatus in that territory. The Seattle office is in charge of Mr. R. F. Robinson.

The capital stock of the Southern Dry Dock & Ship Building Company, Orange, Tex., has been increased from \$100,000 to \$200,000, and all the new stock has been subscribed for. According to advices received, the principal business of the company has changed from shipbuilding to car building, hence the name has been changed in line with the greatest activities; namely, the "Orange Car and Steel Company." The personnel of the officers and management remains the same.

FOREIGN ACTIVITIES

New Dry Dock, Belgium.—The Belgium Government has allocated a sum of 13,000,000 francs for the construction of a new dry dock at Langerbrugge, near Ghent.

Order Placed, England.—Runciman & Company, of Newcastle, England, have placed an order for the construction of two large steamers with John Readhead of South Shields.

New Service, Germany.—The Hugo Stinnes Line has started a monthly service, with six new oil burning passenger and freight vessels of 9,000 to 12,000 deadweight tons, between Hamburg, Rotterdam, Dover, Antwerp and Naples and ports in China, Japan and the Philippines.

New Fireboat, France.—According to a report from the American Consulate, the Chamber of Commerce of Marseilles, France, has recently purchased a new fireboat, costing 400,000 francs, for the protection of the harbor. The new vessel has oil burning motors and can be set in motion at a moment's notice.

Commercial Harbor, Kiel.—The North Harbor of the port of Kiel, located on the Kiel Canal near the

Prince Henry Bridge, was inaugurated October 11, 1922. This small harbor, with a grain elevator of 12,000 tons capacity, is the first step in the realization of the many schemes to make Kiel a commercial port.

New Floating Dry Dock, Southampton, England.—Directors of the London and Southwestern Railway Company, which controls much waterfront property at Southampton, have sanctioned construction of a floating drydock at the port large enough to lift the Majestic. The new dock will be as large as those at Boston and Hamburg.

Contract Award, England.—Messrs. Vickers, Ltd., England, have been awarded a contract to build a new vessel for the Orient Steam Navigation Company. The ship will have a length between perpendiculars of 630 feet, molded breadth 74 feet and gross tonnage approximately 20,000. Her accommodations will include 600 first class and 1,300 third class passengers.

Oil Conversion, Nagasaki, Japan.—The Fukuoka Nichi Nichi reports that, according to information received at Moji and announced by the Department of Commerce, the Nippon Yusen Kaisha has adopted the furnaces of the Lisbon-Marú and four other steamers for the consumption of both coal and oil, owing to the cheapness of the latter. The Toba-Marú and Mayebashi-Marú had previously undergone similar alterations so that seven of the company's steamers are now capable of using oil or coal.

Dockyard Employes' Holiday, Nagasaki, Japan.—In order to avoid wholesale discharge of its employes at its shipyards at Nagasaki, the Mitsubishi Shipbuilding Company has inaugurated a system whereby its employes are compelled to take a week's holiday, in turn, during which time they are to be given 60 per cent or more of their wages. Men called upon to return to work for a short time during the holiday will receive a larger percentage of their pay, says Vice Consul Correll in a report to the Transportation Division of the Department of Commerce.

Contract Awarded, Scotland.—Messrs. Ramage and Ferguson, Ltd., Leith, were awarded a contract for an ocean-going motorship of large dimensions. The vessel will be approximately the same size as the largest motor yacht afloat, the Ara. She will be 200 feet long, propelling machinery will consist of two Sulzer Diesels each of 800 brake horsepower, driving twin screws. The engines will be of the normal two-cycle type fitted with port-scavenging, and will be of the same class as the Sulzer engines installed in many vessels of the Mercantile Marine. It is estimated that the fuel consumption will not exceed eight tons per day.

Official Trials, England.—The single screw cargo steamer S. S. No. 93, built by the London & Montrose Shipbuilding & Repairing Company, Ltd., for Messrs. Llewellyn, Merritt & Price, Ltd., of Cardiff ran very satisfactory official trials; the speed obtained being a knot and a half in excess of the contract. The vessel is of the raised quarter deck type with engines placed aft and is designed to carry 1,050 tons of cargo. She has been constructed for the owners special trade and her dimensions are 189 feet by 30 feet by 14 feet 6½ inches. The propelling machinery has been built by Messrs. William Beardmore & Company, Ltd., of Coatbridge.

Motor Vessel Launched, Greenock, Scotland.—The Drehtdyk, a large awn screw motor vessel built to the order of the Holland-America Line, was successfully launched from the Greenock Yard of Harland & Wolff, Ltd. The new vessel is a high class cargo boat 485 feet by 62 feet by 38 feet 6 inches with a gross tonnage of about 9,000. The total capacity of oil fuel tanks in the vessel is about 1,200 tons. A very complete outfit of derricks and winches is fitted to ensure expeditious handling of cargo. Steering gear, windlass and refrigerating machinery are all electrically driven. The machinery, which was constructed by Harland & Wolff at their Diesel Engine Works, Glasgow, comprises two sets of 8 cylinder 4 cycle Diesel engines on the well-known Brumelster & Wain system. The engines develop a normal horsepower of 8,000 indicated, at 115 revolutions per minute.

Steamer Launched, England.—A handsomely modelled steel twin screw steamer has been launched from the Neptune Works of Swan, Hunter, & Wigam Richardson, Ltd., for the Compagnie Generale Transatlantique, Paris, intended for their mail and passenger service from Le Havre and St. Nazaire to Colon and the Pacific. The steamer is about 495

feet long by 26 feet beam by 38 feet deep and is being constructed to the highest classification in the Registry of the Bureau Veritas. There are four complete decks besides promenade deck, boat deck and navigation deck. The vessel has all the latest improvements and carries first, second and third class passengers. The twin screw machinery, supplied by the builders, consists of two sets of turbines of the "Metropolitan-Vickers Rateau" type, with double reduction gearing of the three box floating frame type, steam being supplied by eight large boilers fitted with Howden's system of forced draft and arranged to burn coal and oil. As the vessel left the ways she was named Cuba.

Launch at West Hartlepool, England.—Messrs. William Gray & Company have launched the steel single screw steamer City of Singapore, which they are building for the Hall Line of the Ellerman Lines, Ltd., Liverpool. The vessel has a length overall of 451 feet, extreme breadth 57 feet 3 inches and depth molded 32 feet 10 inches, cruiser stern, and is classed 100 A-1 at Lloyd's. The ship is fitted out to meet the owners' special requirements for the trade in which she is intended to run, and the double bottom is arranged for the carriage of oil fuel and fresh water. The equipment embodies all the latest improvements, including fresh water distiller, steam windlass, steam steering gear, electric lighting and wireless installation. Propelling machinery, made by the Central Marine Engine Works of the builders, consists of a set of triple-expansion engines with cylinders 24½ inches, 42½ inches, 74 inches diameter by 51-inch stroke, and three large boilers adapted for a working pressure of 225 pounds per square inch, and fitted with Howden's system of forced draft.

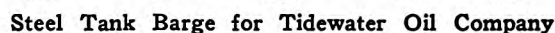
Trial Trip, England.—The trial trip of the steamer Stad Haarlem, built by Messrs. Wm. Gray and Company, Ltd., West Hartlepool, and taken over by Messrs. Halcyon-Lijn, of Rotterdam, was very successful. The dimensions of the vessel are: Length overall, 321 feet 3 inches; breadth, 46 feet 6 inches; depth molded, 26 feet 3 inches, with a deadweight carrying capacity of over 4,800 tons. The Central Marine Engine Works built the propelling machinery, which consists of triple-expansion engines, with cylinders 25 inches, 41 inches, 68 inches diameter, by 45-inch stroke, and three boilers 13 feet 4 inches diameter, by 12 feet 2 inches in length, adapted for a working pressure of 200 pounds per square inch. An oil fuel burning installation is fitted, working in conjunction with Howden's system of forced draught. A large number of "CMEW" steamship auxiliaries are fitted, including auxiliary condenser, direct contact feed heater, evaporator, feed water purifying tank, main feed, centrifugal, harbor feed, ballast, fuel oil, general service, and ash ejector pumps.

New Ship, Holland.—The Nederland Shipbuilding Company of Amsterdam, has signed a contract with British owners for the building of a tanker of 280 feet in length by 46 feet 6 inches beam and 19 feet depth. The vessel will be propelled by steam engines driving twin screws.

Tug Launched, England.—Messrs. John I. Thornycroft & Company, Ltd., have launched from their Woolston shipyard a powerful tug, built and engined for the Towing Department of the Southampton, Isle of Wight, and South of England Royal Mail Steam Packet Company, Ltd.

Successful Trials, England.—The trials of the Lochgoll, a large twin screw motor vessel of 5,500 tons, built by Harland & Wolff, Ltd., at their Govan Shipyard, for the Royal Mail Steam Packet Company, proved very successful. This latest addition to the company's fleet was built under special survey, and is classed 100 A 1, at Lloyd's. She has three complete decks with poop, bridge and fore-castle, her dimensions being 502 feet by 62 feet by 38 feet 6 inches. The steering gear, windlass and the 15 cargo winches are all electrically driven, and there are 38 derricks. The vessel is propelled by two 8-cylinder 4-cycle Diesel oil engines of Harland & Wolff's standard type, on the Burmeister & Wain system. These engines develop 6,000 indicated horsepower at 115 revolutions per minute and will give a sea speed of 12½ knots.

Maiden Voyage, Germany.—The Deutsch-Australische Line cargo steamer Kiel has left Hamburg, Germany, for her maiden voyage to Central America. Her dimensions are approximately 328 feet by 47 feet by 29 feet, with a hold capacity of 3,650 tons gross. The engines are triple-expansion, of 1,800 indicated horsepower, and are designed to steam at a speed of 10.5 knots. The vessel was launched at the Germania Yard, Kiel.



Two Ship Repair Contracts Awarded Moore Company

Moore Shipbuilding Co.....	\$9,500
Los Angeles Shipbuilding & Dry Dock Co., Los Angeles.....	10,050
Bethlehem Shipbuilding Co.....	12,415
" " " "	15,911
Eureka Boiler Works.....	12,953
General Engineering Co.....	17,225
Union Construction Co.....	21,338

UNIVERSITY OF ILLINOIS AT
URBANA-CHAMPAIGN